Sterling Highway Mile Post 45-60 Draft Supplemental Environmental Impact Statement and Section 4(f) Evaluation

STERLING
HIGHWAY MILE POST 45 TO 60
ALASKA

Prepared for:

State of Alaska
Department of Transportation and
Public Facilities

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March 2015

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Sterling Highway MP 45-60 Project

Kenai Peninsula Borough / Cooper Landing, Alaska

Draft Supplemental Environmental Impact Statement and Draft Section 4(f) Evaluation

Submitted pursuant to 42 U.S.C. 4332(2)(c), 16 U.S.C. 3164(e), and 49 U.S.C. 303 by:
U.S. Department of Transportation, Federal Highway Administration, and
State of Alaska Department of Transportation and Public Facilities

This action complies with Executive Order 11988, Floodplain Management; Executive Order 11990, Protection of Wetlands; and Executive Order 12898, Environmental Justice.

Cooperating Agencies
State of Alaska Department of Natural Resources
State of Alaska Department of Fish and Game
U.S. Army Corps of Engineers
U.S. Coast Guard
U.S. Department of Agriculture Forest Service
U.S. Fish and Wildlife Service

Joel St. Aubin for DOT&PF	John Lohrey for FHWA	Tim Haugh for FHWA
Document Approval	*Draft SEIS Approval*	*Draft Section 4(f) Evaluation Approval*
Date of approval: 3/11/2015	Date of Approval: 3/11/2015	Date of Approval: 3/11/15

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The Sterling Highway MP 45-60 Project would improve the highway near the community of Cooper Landing, Alaska. Four alternative alignments are evaluated along with a No Build Alternative. Each "build" alternative includes portions in which the existing alignment would be rebuilt and a portion that would be built on a new alignment. Project information is online at www.sterlinghighway.net.

Comments on this Draft SEIS and Draft Section 4(f) Evaluation are **due by May 26 2015**. Submit comments electronically to the DOT&PF Central Region Environmental Manager via the website at:

www.sterlinghighway.net

Send any comments via email or postal service as follows:

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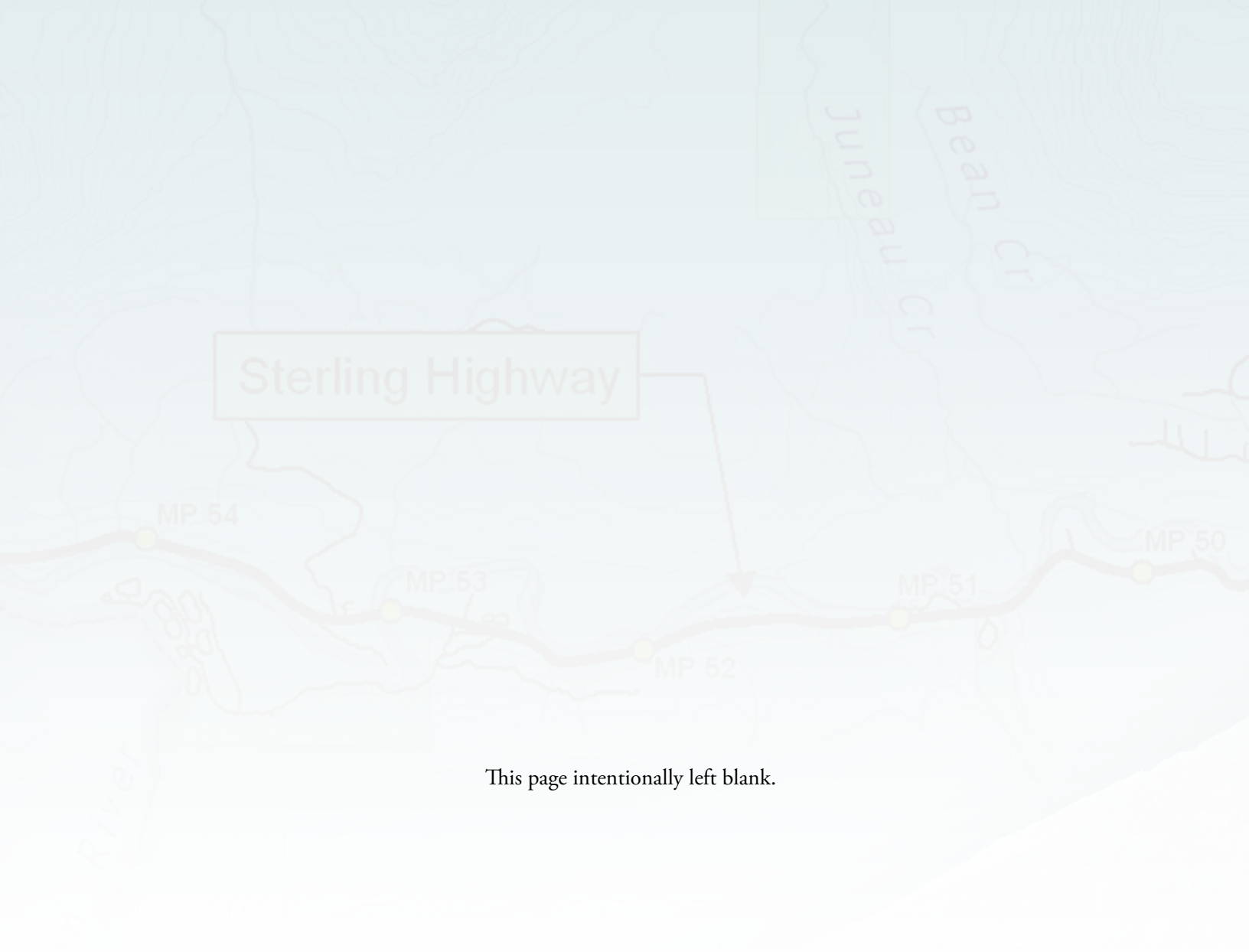
Sterling Highway Milepost 45-60

Draft Supplemental Environmental Impact Statement and Draft Section 4(f) Evaluation

Executive Summary

MARCH 2015



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STERLING

HIGHWAY MILE POST 45 TO 60

ALASKA

Executive Summary

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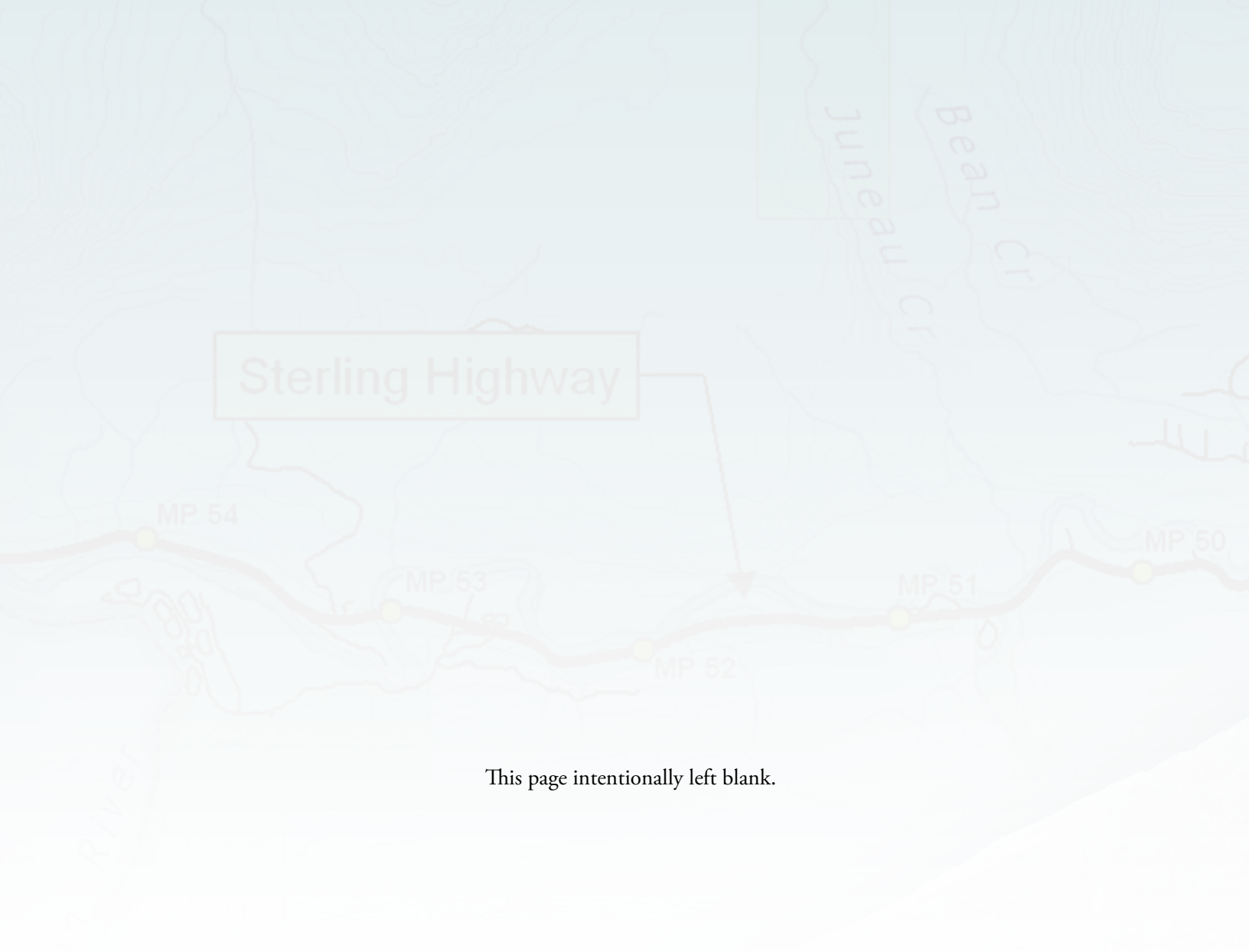

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The Project at a Glance

Originally completed in 1950, the Sterling Highway is the only road that links western Kenai Peninsula communities (e.g., Kenai, Soldotna, and Homer) to the rest of the state. For many years, the Alaska Department of Transportation and Public Facilities (DOT&PF) has recognized the need for improved safety and traffic flow along this highway to accommodate increased traffic from community growth, recreation, and tourism.

The Problems and Challenges

The Sterling Highway from Milepost 45 to 60 follows the Kenai River valley through the Kenai Mountains. The highway's problems and challenges through Cooper Landing include:

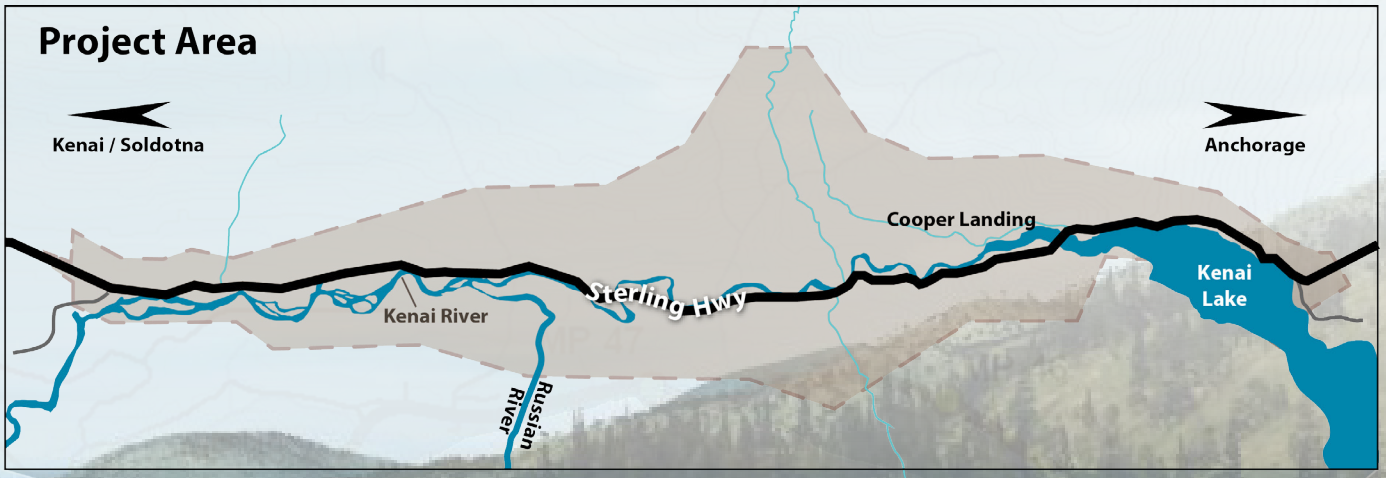
- A constricted valley between the Kenai River and steep mountain walls
- Narrow, curvy highway design
- Traffic congestion
- Many driveways and side roads
- Conflicts between local traffic and through-traffic
- Elevated crash rate
- Risk of contaminant spills into the Kenai River

The scenic nature of the area, community growth, and world-class fishing on the Kenai and Russian rivers combine to create serious congestion problems for the highway from May through September. This level of congestion has created safety issues for highway travelers, especially in areas where high-speed traffic conflicts with vehicles turning on and off the highway.

The Goal

DOT&PF seeks to:

- Reduce congestion
- Improve the highway to current "rural principal arterial" design standards
- Improve highway safety



See detailed project map on pages 3-4.

Whose project is this?

The Sterling Highway Milepost (MP) 45 to 60 Project is proposed by the DOT&PF (as the highway owner) and by the Federal Highway Administration (FHWA). FHWA administers Federal transportation project funds, which means that FHWA would approve the final environmental impact statement and subsequent record of decision.

Overview

Sterling Highway Milepost 45-60

Thousands of Alaskans and visitors from around the world drive to the spectacular upper Kenai River every summer. Most come from Anchorage, which is home to the majority of the state's population and the region's main airport. From the other direction, they may come from Kenai, Soldotna, or Homer—the principal cities on the western Kenai Peninsula. From either direction, they drive a consistent highway—with uniform lane widths, ample shoulders, and curves designed for uniform highway speeds—until they approach Cooper Landing.

Near Cooper Landing, the Sterling Highway reverts to its original design, with narrow lanes, no shoulders, and sharp curves. The highway through this stretch was constructed in the 1940s and 1950s and served the traffic and vehicles of that time. Since then, however, the sizes and numbers of cars and trucks have changed, as well as the standards for a highway's lanes, shoulders, and sharpness of curves. Along this stretch, the highway does not meet current highway standards. The narrow lanes and shoulders, sharp curves, and poor visibility mean the road is less safe than similar roads around the state.

In summer, traffic overwhelms the road. Cooper Landing and the nearby confluence of the Kenai and Russian rivers draw people for fishing, boating, camping, and hiking. This slow-moving local traffic is continually pulling on and off the highway. People traveling through the area, between places like Soldotna and Anchorage, share the same highway and get caught in the local traffic.

The idea of a new highway in the Cooper Landing area is favored by some people and is a source of concern for others.

Why favored?

This project holds promise for a better highway design and safer driving experience. The Sterling Highway runs for several miles along the Kenai River, in some places following every bend. The road is narrow and winding, with low speed limits in some areas, with no shoulders or adequate space along the road for safety, with little opportunity to pass, and with many connecting driveways that create multiple access

points to the highway. Traffic is gradually increasing and has been for decades, reducing the ability of the highway to handle the traffic.

Upgrades to modern highway design standards would allow for more consistent highway speeds to serve long-distance travelers and commercial truck traffic. With a new highway route, segments of the old highway would remain as a lower-speed road suited to serving local and recreational traffic. A reconstructed highway would match other nearby portions of the Sterling and Seward highways, which have been upgraded to modern standards.

Why is there concern?

The Kenai River valley is not an easy place to improve a road. Land along the highway in Cooper Landing is largely built upon, leaving little room to alter the alignment or widen the highway without impacts to private property. The topography of mountain slopes and river bends also physically constrains the design of the highway, in some cases forcing proposed alignments into locations that are protected or important for other uses. Any change to the highway likely would impact wildlife corridors and habitat, recreation areas, and cultural sites. The Cooper Landing community provides essential support services, and people are concerned that traffic might be routed away from existing businesses.

The Kenai River is a State park, and the confluence of the Russian and Kenai rivers is a major destination for sport fishing. The two rivers also attract a concentration of brown bears. Most of the land in the area is managed by Chugach National Forest and Kenai National Wildlife Refuge.

The area is largely natural and provides habitat for bears, moose, and other wildlife. Besides fishing, people enjoy camping, hiking, mountain biking, rafting and boating, and backcountry winter sports on these public lands.

The fish in the confluence area have been important to Native peoples for thousands of years, and the river was important later to early Russian and American explorers and gold miners. Hundreds of historic and archaeological features dot the area and make it culturally important today to the Kenaitze Indian Tribe and to Cook Inlet Region, Inc. (CIRI), the regional Alaska Native corporation, which owns land in the area. All of this makes the area a complex setting for this project.

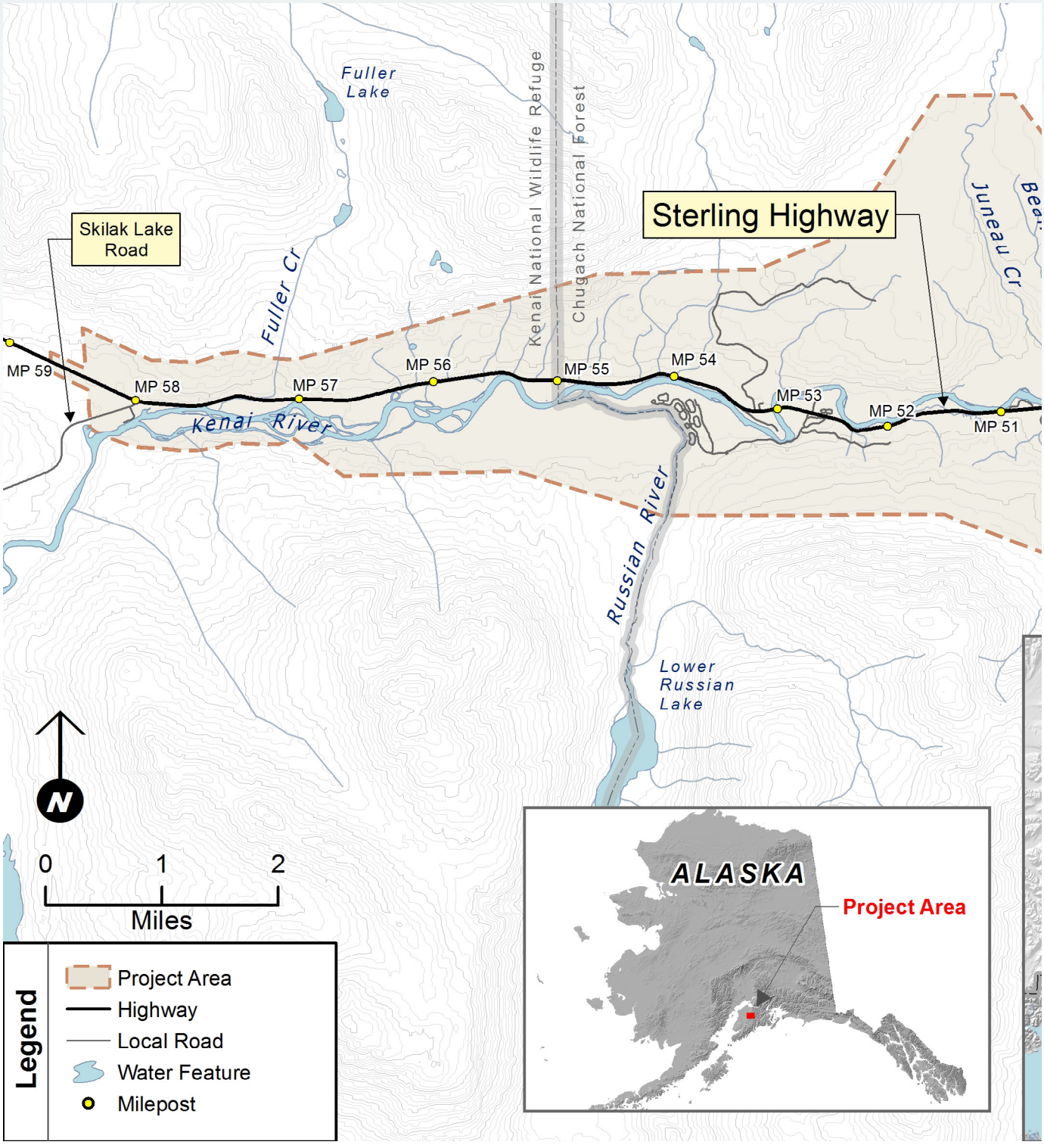
What is an EIS? An Environmental Impact Statement (EIS) is a document prepared to describe the effects of proposed activities on the environment. It considers both the natural and physical environment and the relationship of people with the environment. The purpose of developing an EIS is to help agencies, officials, and the public make sound decisions. Its preparation is prescribed by the National Environmental Policy Act of 1969, and it is necessary to disclose potential impacts in order to secure the use of Federal funding for transportation projects.

Why is this a supplemental EIS?

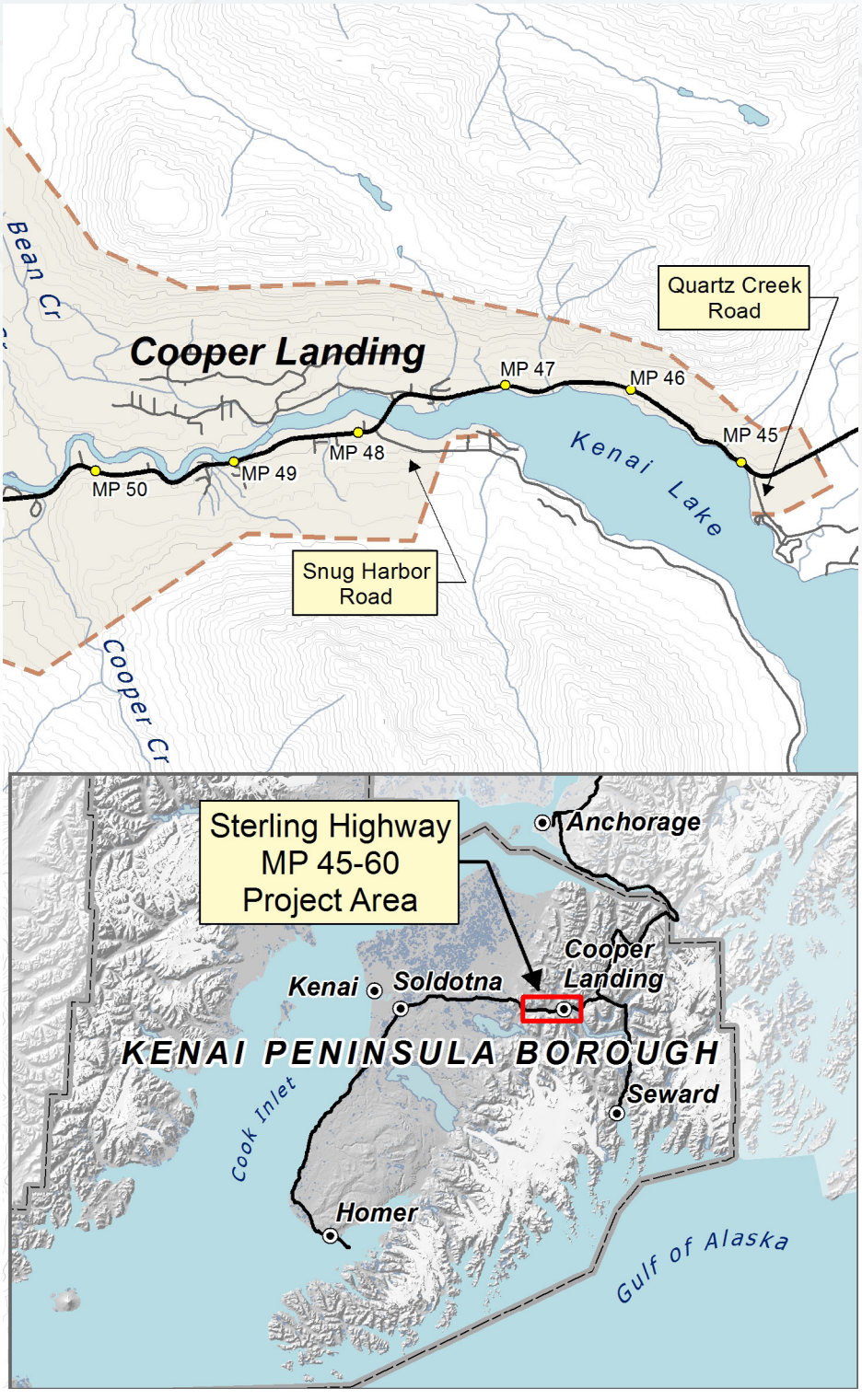
A supplemental EIS (SEIS) is meant to review the findings of an existing EIS and supplement them with new or updated information. DOT&PF and FHWA previously released two draft EISs for this project, in 1982 and 1994. These addressed a larger project area, extending from MP 37 (Seward Highway junction) to MP 60, 8 miles longer than the current project area (MP 45-60). Based on the complexity in the MP 45-60 area and on a determination that the MP 37-45 project would be useful on its own, the 8-mile segment was expedited and constructed by 2001. At about the same time, DOT&PF began preparing this SEIS, building on past work. Because the entire MP 37-60 area has been under a single ongoing work agreement between DOT&PF and FHWA since the 1970s, this EIS is formally considered a supplement. Enough time has passed, however, that all research was begun anew.

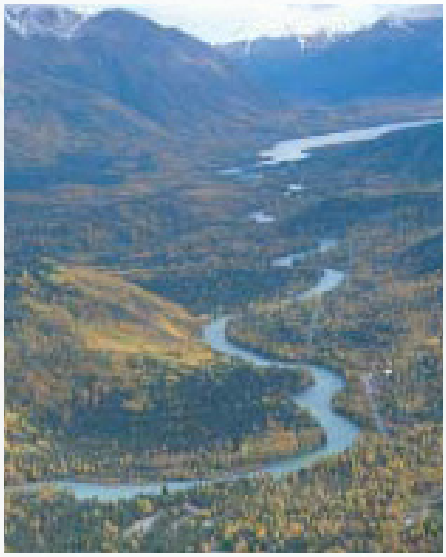
Where is the project?

The Sterling Highway is located on the Kenai Peninsula in Southcentral Alaska. It runs east-west through the Kenai Mountains and continues to the City of Homer. The project area is in the heart of the Kenai Mountains and runs from MP 45 to MP 60. The project's starting and stopping points for construction would be the intersection of the existing



Sterling Highway with Quartz Creek Road on the east and the intersection with Skilak Lake Road on the west. The limits of any potential construction activities would be MP 44.5 to 58.2. However, MP 45 and MP 60 have been used historically to define the project, and therefore continue to be used as part of the project's formal name.





Why is the Sterling Highway important?

The Sterling Highway is the only road that connects the western Kenai Peninsula with the Seward Highway and the rest of the nation's highway system. It is part of the National Highway System and is Interstate Highway A-3. While the eastern end of the Sterling Highway connects to the rest of the national highway system on land, the opposite end of the Sterling Highway, at the city of Homer, connects to the Alaska Marine Highway System (ferry). Marine Highway ferries connect travelers by ocean to other Alaskan communities and the North American highway system at points in Southcentral and Southeast Alaska; at Prince Rupert, British Columbia; and at Bellingham, Washington.

Purpose and Need

What is "Purpose and Need," and how does it affect the process?

The Purpose and Need describes transportation problems the project is meant to address. It also helps the public and agencies determine which of the proposed alternatives best solve the transportation problems.

What is the project purpose?

The purpose of the project is to bring the highway up to current standards to efficiently and safely serve through-traffic, local community traffic, and traffic bound for recreation destinations in the area both now and in the future. DOT&PF and FHWA recognize the importance of protecting the Kenai River corridor while still achieving this transportation purpose.

What are the needs for the project?

There are three interrelated needs that the project would address: reducing highway congestion, meeting current highway design standards, and improving highway safety.

Need 1: Reduce Highway Congestion.

The construction of multiple driveways and side street accesses over time, combined with a curvy, constrained alignment with little passing opportunity and increasing traffic volumes, has led to unacceptable congestion that is forecast to worsen in the future. As a result, the highway performs below acceptable levels of service (LOS) for a rural principal arterial that is a component of the National Highway System. LOS is illustrated in the Congestion graphic to the right.

Congestion

Level-of-service (LOS) is a term used to qualitatively describe roadway and intersection traffic operations using "letter grades" ranging from A (best) to F (worst).

LOS A describes the highest quality of traffic service. Motorists travel at their desired speed. Without strict enforcement, LOS A results in average speeds of 55 mph or more for rural principal arterial highways. Passing demand is below passing capacity. Platoons of three or more vehicles are rare. Drivers are delayed no more than 35% of their travel time by other vehicles.

LOS B characterizes traffic flow with speeds of 50 mph or slightly higher on level terrain. The demand for passing to maintain desired speeds becomes significant. Drivers are delayed in platoons up to 50% of the time.

LOS C describes noticeable increases in platoon formation, platoon size, and frequency of passing impediments. The average speed still exceeds 45 mph. Chaining of platoons can occur. Although traffic flow is stable, it is susceptible to congestion due to turning traffic and slow-moving vehicles. Percent time spent following may reach 65%.

LOS D describes unstable traffic flow. Passing demand is high, with passing capacity near zero. Platoon sizes of 5-10 vehicles are common, although speeds of 40 mph still can be maintained. Turning vehicles and roadside distractions cause major shock waves in the traffic stream. Motorists are delayed in platoons nearly 80% of their travel time.

LOS E describes a condition where percent time spent following is greater than 80%. Speeds may drop below 40 mph, down to 25 mph on sustained grades. Passing is virtually impossible. Platooning becomes intense. Operating conditions are at capacity and unstable.

LOS F represents heavily congested flow with traffic demand exceeding capacity. Speeds are highly variable (possibly stop-and-go). While more cars are on the road at each level through LOS D/E, the traffic volume decreases at LOS F because vehicles cannot move freely.

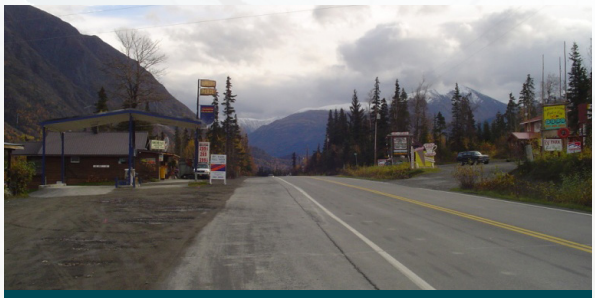
Need 2: Meet Current Highway Design Standards.

Existing characteristics of the Sterling Highway do not meet current design standards for a rural principal arterial road. The existing highway contains curves, shoulders, guardrail, and clear zones that do not meet current design standards (see Current Design Standards and the Existing Highway table below).

Need 3: Improve Highway Safety.

The interrelated effects of highway congestion and outdated highway design characteristics lead to higher-than-average rates of traffic crashes in the project area, and a greater severity of crashes, when compared to the statewide average. The combination of narrow lanes, narrow or non-existent shoulders, sharp curves, and a high number of access points result in these safety issues. The crash rates are higher than the statewide average for similar types of roadways (rural principal arterials). The severity of crashes—that is, those that have major injuries or fatalities—is higher than the statewide average for portions of the highway in the project area.

Few passing opportunities exist in the project area.



Driveways cause conflict points that slow traffic and increase the chance of crashes.

The use of pullouts by recreational traffic contributes to the problems needing to be addressed on the Sterling Highway.

The road is narrow and curvy. Sharp curves require reduced speed.

Current Design Standards and the Existing Highway

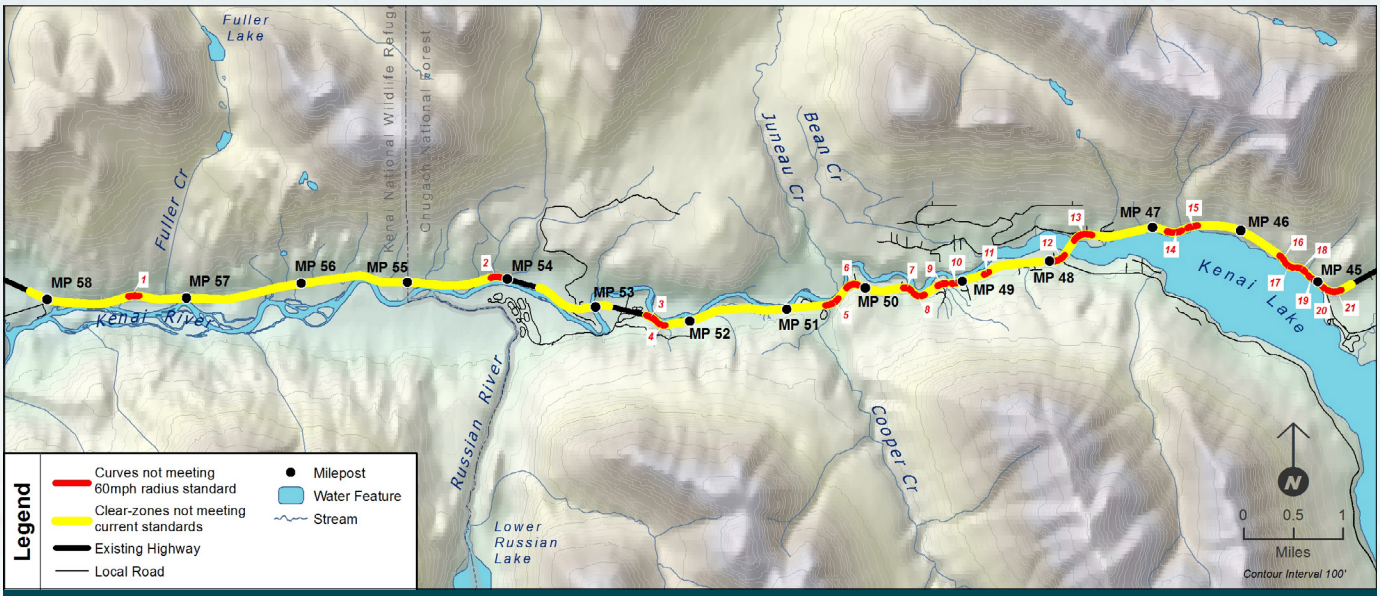
	Design Standards[a]	Distance Not Meeting Standard	Percent Not Meeting Standard
Design Speed *(mph)*	60	15 miles at 55 mph or less 4 miles at 40 mph or less	100%
Minimum Curve Radius *(feet)*	1,330	21 of 43 curves less than standard radius	49%
Lane Width *(feet)*	12	13.7 of 15 miles less than 12-foot-wide lanes	91%
Shoulder Width *(feet)*	6–10	15 of 15 miles less than 6-foot-wide shoulders	100%
Clear Zone *(feet)*	30–32	14 of 15 miles less than 30-foot-wide clear zone	95%

[a] *The design standards are guidelines spelled out in AASHTO 2004 and adopted by DOT&PF and FHWA and, in this case, are specific to "rural principal arterial" highways. The design standards frequently represent a range of values, allowing designers some latitude based on local conditions. DOT&PF has identified 60 mph as the appropriate design speed for the project corridor.*

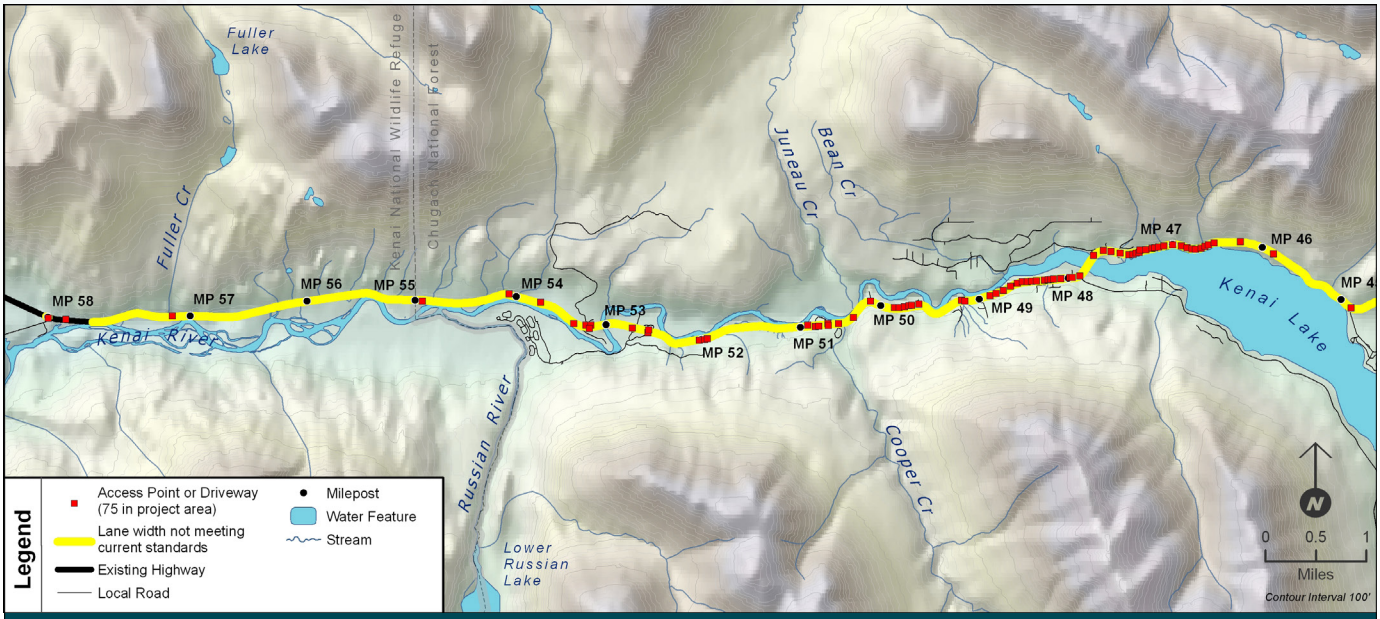
Where do I look in the Draft SEIS?

» Chapter 1 addresses purpose and need.

Purpose and Need continued...



Curves and clear-zones along the existing Sterling Highway



Access points and narrow lane widths along the existing Sterling Highway

Sharp Curves

49%

of the curves are too sharp

Narrow Lanes and Clear Zone

91% of lanes are too narrow

14 out of 15 miles do not meet standards for clear zone—the roadside border area to provide a safe vehicle runout area.

clear zone should be 30 feet.

Narrow Shoulders

Narrow or nonexistent shoulders increase the chance for run-off-the-road accidents.

Alternatives

Preliminary engineering and the alternatives screening process narrowed the potential build alternatives to four. These four and the No Build Alternative are evaluated in detail in the SEIS.

1. No Build Alternative

2. Cooper Creek Alternative

3. G South Alternative

4. Juneau Creek Alternative

5. Juneau Creek Variant Alternative

What is the No Build Alternative?

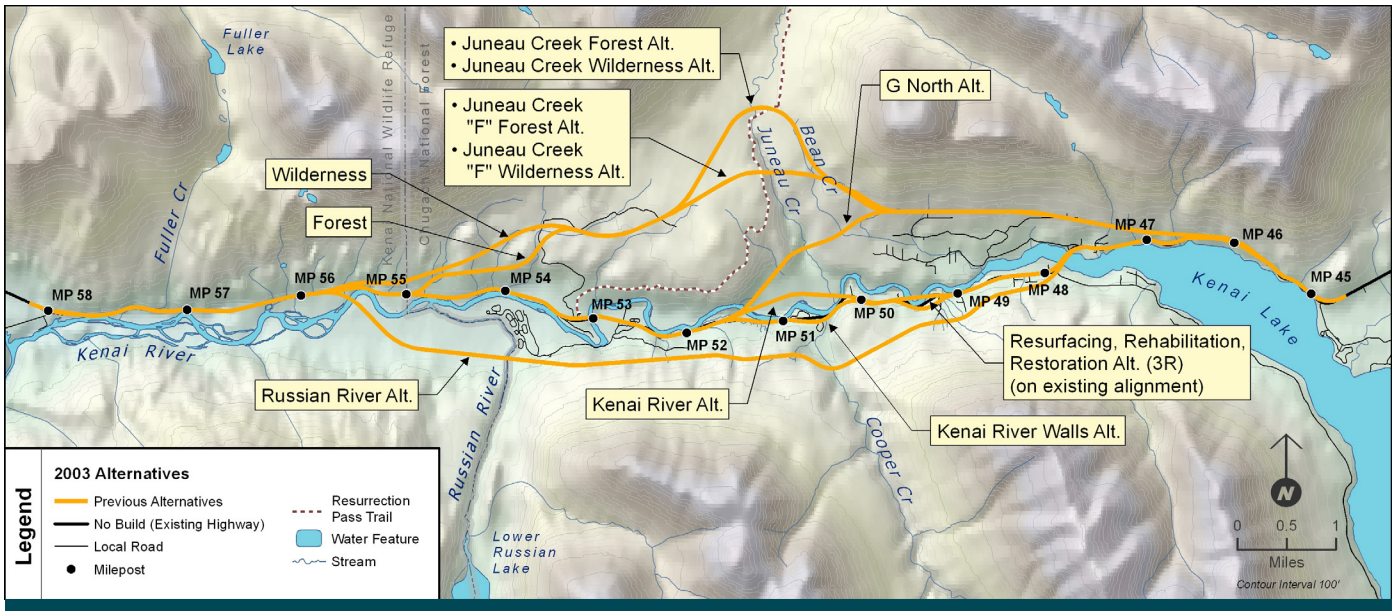
The National Environmental Policy Act requires that an EIS describe and analyze the impacts of not building the project as a benchmark that allows for comparison of the degree of environmental effects of the various project alternatives. In this document this alternative is called the "No Build Alternative." Under the No Build Alternative, the highway would remain much as it is today, with only maintenance and already programmed work assumed to occur.

What are the Build Alternatives?

The four build alternatives are the Cooper Creek Alternative, G South Alternative, Juneau Creek Alternative, and Juneau Creek Variant Alternative. Each of the build alternatives is engineered based on highway design standards for rural principal arterials. The build alternatives are identical from MP 45 to MP 46.3, at the eastern end of the project, and from MP 55.8 to MP 60, at the western end of the project. Each alternative would consist of a two-lane highway with paved shoulders, passing lanes, and turning lanes. Travel lanes would be 12 feet wide, paved shoulders would be 8 feet wide (adequate for safe bicycle and pedestrian use), passing lanes would be 12 feet wide, and all major intersections would have right- and left-turn lanes. No interchanges would be constructed. T-intersections would be used where the "old" highway intersects new segments within each alternative. Maps on pages 11 and 12 illustrate the build alternatives.

Were other alternatives considered?

More than thirteen alternative alignments were considered. Those that are fully analyzed in the SEIS are considered to represent the full range of reasonable alternatives. Those not carried forward were determined either not reasonable or similar to (but not as good as) a nearby similar alignment.



Alternatives considered and rejected.

Alternatives were determined to not be reasonable for a combination of the following factors:

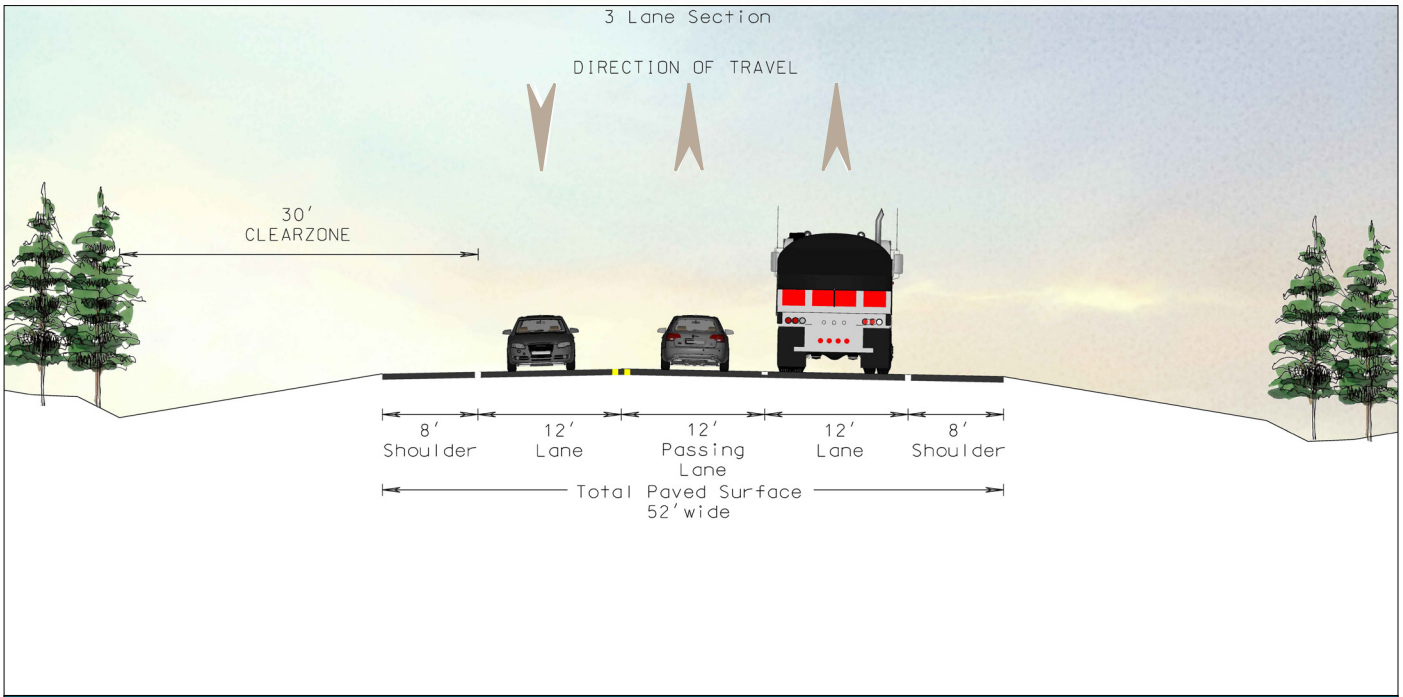
- Technical problems (for example, poor rock or soils).
- Inability to satisfy the project purpose and need (for example, grades too steep for a safe road).
- Impacts to the community, the natural environment, recreational areas, or high costs.
- General lack of public and agency support.

A formal analysis process that used criteria based on the purpose and need and preliminary impact assessment was conducted and is summarized in Chapter 2 of the SEIS. A map of alternatives considered and rejected appears on page 9.

Why not just improve the existing highway all the way through?

A segment of the existing highway in the area from MP 49 to MP 50.5 has several curves that do not meet current standards for a rural principal arterial. The hillside in this area rises abruptly from the winding Kenai River and its floodplain. The hillside is composed of fine-grained soils such as silt and clay-like soils. These soils were left by glacial retreat and water action. They were eroded into steep slopes by the Kenai River and its tributary, Cooper Creek. The soils are prone to landslides and mud flows. Multiple teams of DOT&PF and consulting engineers have examined this area over 30 years and determined that any alignment that straightened out the curves and widened the highway to meet standards would require huge cuts into the poor soils or would require direct impacts to the Kenai River. Civil and structural engineers have consistently recommended against large cuts in this area because of the unusual wall heights (as tall as 16-story buildings) and risk of slope and structure failure. Therefore, all alternatives have been routed around this area.

Highway Cross-Section. The highway would generally be a two-lane highway, but many portions of each alternative would have a passing lane or turning lane (three-lane cross-section, as shown below), and some areas would have passing lanes in both directions (four-lane cross-section). Widths of each lane (12 feet), widths of shoulders (8 feet), and clear zones (30 feet from lane edge) would be the same throughout.

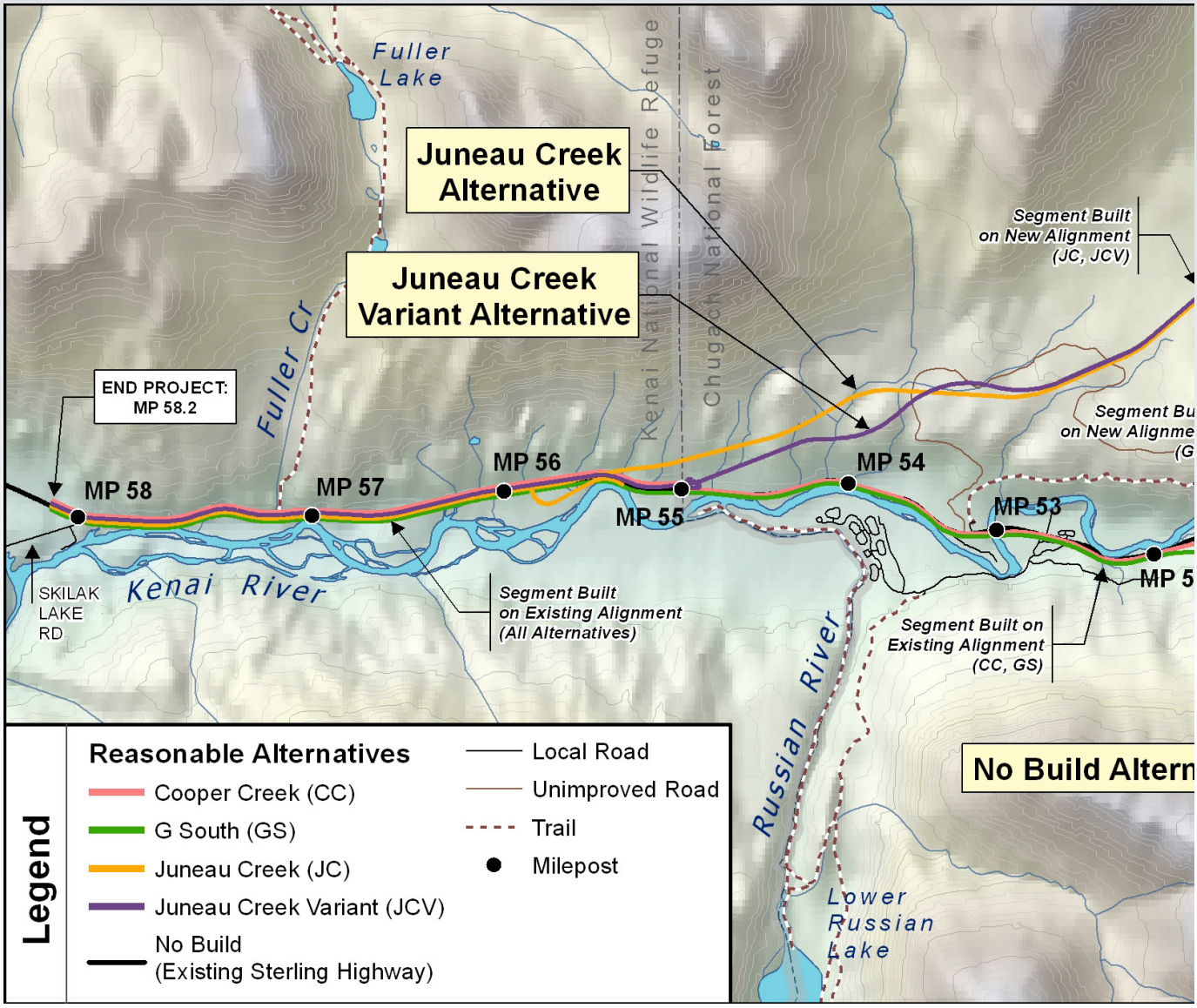


Proposed Highway Cross-Section (applies to all build alternatives)

Where do I look in the Draft SEIS?

- Chapter 2 addresses alternatives.

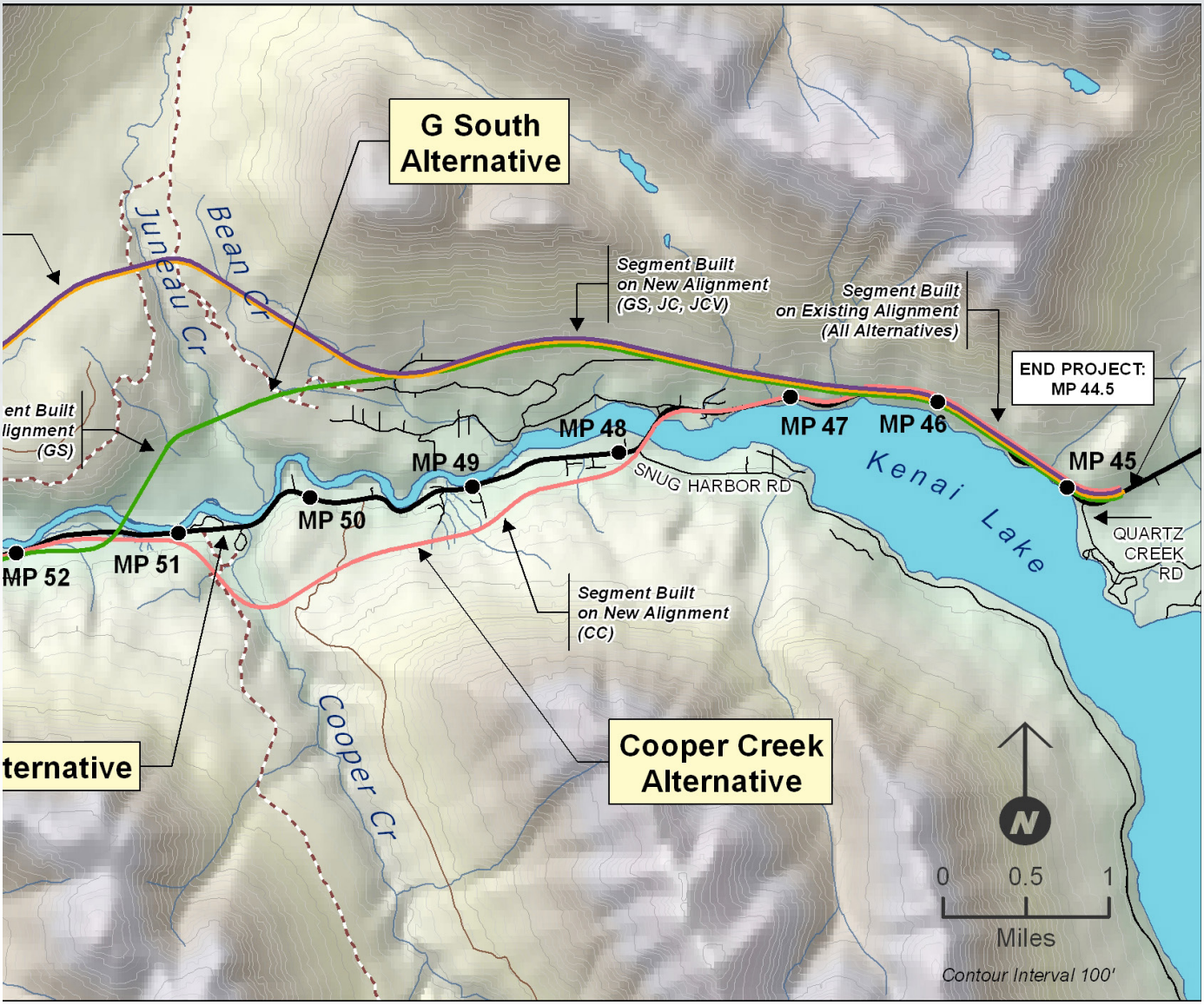
Alternatives evaluated in detail in the SEIS



Cooper Creek Alternative. The Cooper Creek Alternative follows the existing alignment for most of its length. Only about 3.5 miles would be located on a new alignment, routed south of Cooper Landing. This alternative would include construction of three large bridges—two replacing existing Kenai River bridges and one new large bridge over Cooper Creek.

G South Alternative. The G South Alternative would construct 5.5 miles of new alignment skirting north of Cooper Landing and the Kenai River, reconnecting with the existing alignment near MP 52. This alternative was designed to avoid impacts to the Resurrection Pass Trail and Juneau Creek Falls area. This alternative would include construction of three bridges—one replacing an existing bridge over the Kenai River and two new bridges, a large bridge over lower Juneau Creek, and one new bridge over the Kenai River.

Juneau Creek Alternative. The Juneau Creek Alternative deviates from the existing alignment more than the other alternatives—about 10 of 14 miles would be on a new alignment. It would run north of Cooper Landing and the Kenai River, climbing the hillside and crossing Juneau Creek Canyon with a new bridge south of Juneau Creek Falls. The new segment would cross the Mystery Creek Wilderness in the KNWR and would rejoin the existing highway at about MP 56. The alternative includes one large



bridge spanning Juneau Creek Canyon. It would be the longest single-span bridge in Alaska.

Juneau Creek Variant Alternative. The Juneau Creek Variant Alternative is almost the same as the Juneau Creek Alternative but was specifically designed to avoid use of land from the KNWR and the Mystery Creek Wilderness. The Juneau Creek Variant Alternative would rejoin the existing alignment at MP 55 of the existing highway near Sportsman's Landing. The alternative includes one large bridge crossing Juneau Creek Canyon. It would be the longest single-span bridge in Alaska.

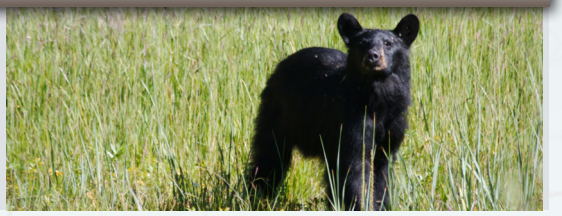
Simulation of the proposed highway along the common alignment at the east end of the project area (MP 44.5).

Where do I look in the Draft SEIS?

» Chapter 2.6 SEIS Alternatives Advanced for Full Analysis

Affected Environment and Environmental Consequences

DOT&PF and FHWA analyzed the social and environmental conditions of the project area. Results of the analysis are the baseline for determining the potential impacts of the alternatives.



The analysis of existing conditions and impacts includes issues raised by agencies and the public, and issues discussed by the DOT&PF and FHWA in consultation with agencies while preparing the SEIS. This executive summary focuses on resources with greater potential impacts, resources identified during scoping as being resources of particular concern, and resources that illustrate substantive differentiation among alternatives. The impact tables at the end of this executive summary provide quantified data, where available, about impacts to resources. A larger number of resources and much more detailed discussion appear in the Draft SEIS (see Chapter 3). Chapter 4 of the Draft SEIS focuses on lands protected by Section 4(f) of the U.S. Department of Transportation Act; Federal transportation law provides additional protection for certain parks, wildlife refuges, recreation areas, and cultural/historic sites.

Where do I look in the Draft SEIS?

- Chapter 3 covers the "Affected Environment," "Environmental Consequences," and mitigation measures.
- Chapter 4 covers Section 4(f) impacts (park, recreation area, refuge, and cultural site impacts).

Land Ownership / Land Use Plans and Policies

Most lands in the project area are owned and managed by the Federal government, including the U.S. Forest Service (Chugach National Forest), east of MP 55, and the U.S. Fish and Wildlife Service (KNWR), west of MP 55. Within the Federal lands, and generally in blocks near the highway, there are undeveloped State- and Borough-owned lands, as well as smaller vacant and developed private parcels. Two relatively large parcels of private land are owned by Cook Inlet Region, Inc. (CIRI), the regional Alaska Native corporation formed by the Alaska Native Claims Settlement Act.

One important land issue involves the KNWR. The KNWR encompasses much of the western Kenai Peninsula. It is the most visited of Alaska's many wildlife refuges and provides the most accessible Federally designated Wilderness. The KNWR was established originally to protect the Kenai Peninsula moose population and generally to protect multiple wildlife and bird species. Its purposes include recreation that is compatible with wildlife protection. The existing highway is within a DOT&PF right-of-way easement on KNWR land. North of the highway right-of-way in the project area is the Mystery Creek Wilderness; south of the right-of-way is the Kenai River and then the Andrew Simons Wilderness.

Key Impacts and Issues:

- Impact to private land owners was an issue raised by the public, and land management agencies are interested in impacts to their Borough, State, or Federal lands. The tables at the end of this summary display the acreage of impacts on various public and private land owners. The Cooper Creek Alternative would impact more private land than the other alternatives—see also the Housing and Relocation section on pages 14-15.

- One of the most important issues for this project is the effect to Federal Wilderness land. The Juneau Creek Alternative differs from the other alternatives because it would cross a corner of the Mystery Creek Wilderness. The affected area would be 33.4 acres of the 1.9-million-acre KNWR, including 19.1 acres of the KNWR's 1.3 million acres of designated Wilderness. As this alternative proposes to reroute the Sterling Highway through a national Wildlife Refuge and designated Wilderness, it is subject to the procedural requirements, and determinations required under ANILCA Title XI, Transportation and Utility Systems (TUS). ANILCA Section 1106 (b) provides the procedural requirements for approval of a TUS in a designated Wilderness area, including Presidential review and recommendation and Congressional approval.
- The Russian River Land Act allows CIRI and the KNWR to exchange lands in this area. CIRI owns land just outside the KNWR boundary that would lie adjacent to the Cooper Creek, G South, and Juneau Creek alignments and that would be bisected by the Juneau Creek Variant Alternative. CIRI requested that the DOT&PF and FHWA continue to analyze the Juneau Creek Alternative fully in the SEIS. CIRI has stated an intention to pursue a land exchange.
- The Juneau Creek and Juneau Creek Variant alternatives would cross the Resurrection Pass National Recreation Trail; other alternatives would not. Like KNWR, the 1,000-foot-wide trail corridor is subject to ANILCA Title XI. However, because it is not Wilderness, it does not require approval of the President and Congress. (See also Parks and Recreation Resources, Section 3.8 of the SEIS).

Housing and Relocation

Much of the housing in Cooper Landing is used seasonally, with a smaller year-round base of residents. According to the 2010 U.S. Census, there were 395 housing units in Cooper Landing, of which 234 were vacant. Of the 234 vacant housing units, 207 were used seasonally and were generally not available for rental. There are also a number of undeveloped private lots in the community and other lots platted by the Kenai Peninsula Borough.

Where do I look in the Draft SEIS?

- Land Ownership in Section 3.1.
- Land Use Plans and Policies in Section 3.2.
- KNWR and ANILCA Title XI issues in Section 3.2, specifically 3.2.12, 3.2.1.5, 3.2.2.5 (KNWR), and 3.2.5 (Title XI). Chapter 4 also addresses the KNWR as a Section 4(f) resource.

Crossing Wilderness

Wilderness designated by Congress is particularly complex to cross with a road corridor, because the Wilderness Act defines a designated Wilderness as a large area without roads. Typically Wilderness areas do not allow wheeled or mechanized vehicles. The Alaska National Interest Lands Conservation Act (ANILCA) provides a mechanism in Title XI to authorize road corridors across Wilderness lands in Alaska.

Housing and Relocation continued...

Key Impacts/Issues:

- The Cooper Creek Alternative would impact 38 privately owned properties. Sixteen would be completely acquired. Of the 16, 6 are vacant parcels, 8 have developed residences that would require relocation, and 2 have accessory buildings.
- The G South Alternative would require partial acquisition of 6 vacant private properties but would not require relocation of any residences or businesses.
- The Juneau Creek Alternative would require partial acquisition of 4 private properties. None of these acquisitions would require any relocation.
- The Juneau Creek Variant Alternative would require partial acquisitions of 5 private properties. None of these acquisitions would require any relocation. One of the 5 properties is a 42-acre CIRI parcel near Sportsman's Landing, which the alignment would bisect.

Mitigation Measures:

Adversely affected property owners would compensated at fair market value as provided by the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, and the Alaska Relocation Assistance and Real Property Acquisition Practices (Alaska Statutes 34.60.010 et seq.).

Where do I look in the Draft SEIS?

- Housing and Relocation: Section 3.4

Economic Environment

The Kenai and Russian rivers draw thousands of people for salmon and trout fishing, and rafting—both tourists and in-state recreationists. Fishing and outdoor recreation, combined with the lake, river, and mountain scenery, drive much of the local economy. Cooper Landing is the only location between Summit Lake, Moose Pass, and Sterling that provides services to highway travelers. Many bed and breakfast inns, resorts, and fishing lodges in Cooper Landing accommodate visitors. The economy is seasonal and experiences a fluctuation of annual employment, as businesses reduce the number of employees or close entirely during the winter.

River-based businesses, such as guiding and lodging businesses catering to fishing and recreational enthusiasts, are destinations and are less dependent on spontaneous (drive-by) customers. Highway-based businesses, such as gas stations, grocery and general merchandise stores, restaurants, and motels, are more dependent on highway vehicle traffic and spontaneous stops.

Most businesses in the project area are clustered in the central commercial area of Cooper Landing (MP 47-50), but a few lodges, dining establishments, and gas stations occur outside the community along the highway.

Agencies and the public, particularly residents of Cooper Landing, have expressed concern that alternatives built on a new alignment would induce, or spur, development. One concern is that the highway could provide new access to previously undeveloped State or Borough lands, and new rural residential neighborhoods would spring up. A related concern is that new businesses would open to serve travelers along new highway segments and draw business away from the existing community. River-based businesses appear to be destination-oriented; their owners are more concerned about protecting the quality of the Kenai River and reducing traffic congestion in the area where they transport rafts and clients and less concerned about loss of drive-by customers. Highway-based retail businesses are more concerned about reduced business if traffic were removed from passing by their businesses.

Land use planning goals for the community of Cooper Landing, adopted into the Kenai Peninsula Borough

Comprehensive Plan, indicate a desire to retain the commercial center within Cooper Landing and to avoid development of a competing commercial center along any new highway segment.

Key Impacts/Issues:

» All build alternatives include a highway segment built on a new alignment that would remove about 70 percent of the traffic from all or a portion of the central commercial area of Cooper Landing. A benefit of reducing traffic would be a more attractive community environment, with decreased congestion and improved safety for pedestrians, residents, and visitors to the community. Decreased traffic also would benefit local businesses that use the existing road in their daily local business transactions, such as river guides who shuttle rafts and sport fishing clients. People currently relying on Cooper Landing businesses would likely continue to do so, although some spontaneous economic activity would decrease. To varying degrees, all of the build alternatives have the potential to adversely affect individual businesses by diverting travelers who might make spontaneous stops at businesses located on the "old" highway. These spontaneous stops constitute a meaningful portion of their clientele, especially for highway-related businesses like gas stations, eateries, and convenience stores. This would be more of an issue for the G South Alternative and the two Juneau Creek alternatives, because they would not be routed through any portion of the community. The Cooper Creek Alternative would remain more connected to the community but would divert from the existing highway immediately south of the Cooper Landing Bridge.

» DOT&PF would not allow driveways and side roads to be connected to highway segments built on new alignments (bypass segments). Access to developable land adjacent to the bypass segments would need to be from the existing Sterling Highway only, as it is today. Therefore, no competing commercial development is anticipated as a result of this project, none of the build alternatives would create any new access to developable lands, and none of the build alternatives would induce new development of businesses or residences.

» All build alternatives would cost millions of dollars to build and maintain over the life of the project (see the Costs of the Alternatives table below). These funds would be Federal and State monies allocated for transportation projects. Such funds are limited, and use for this project would mean they would not be available for other Alaska transportation projects. The funds would flow principally to Alaska design and construction firms and into the Cooper Landing, Southcentral Alaska, and statewide economy.

Mitigation Measures:

The project would include directional signs to ensure that motorists were aware that business services were available in Cooper Landing, off the main highway.

Where do I look in the Draft SEIS?

» Economic Environment: Section 3.5

Costs of the Alternatives (millions)

	Cooper Creek	G South	Juneau Creek	Juneau Creek Variant
Construction[a]	$236.2	$250.4	$205.4	$211.6
Other Costs[b]	$54.5	$53.1	$44.2	$45.4
Total	**$291**	**$304**	**$250**	**$257**

[a]Construction costs include the road itself and bridges/tunnels/retaining walls, plus 20% for contingencies, and 15% for construction administration.
[b]Other costs include permitting, design, utility relocations, right-of-way acquisition, and Indirect Cost Allocation Plan (ICAP). Note that right-of-way costs estimate the land payment portion only. It does not address the other per parcel costs of land acquisition. These costs only reflect privately owned land impacted by the alternatives. Land owned by Federal, State, and Municipal agencies is assumed to be acquired via interagency land transfers.

Parks and Recreation Resources; and Section 4(f)

The upper Kenai River area draws many people, both Alaska residents and visitors, for recreation. The area contains:

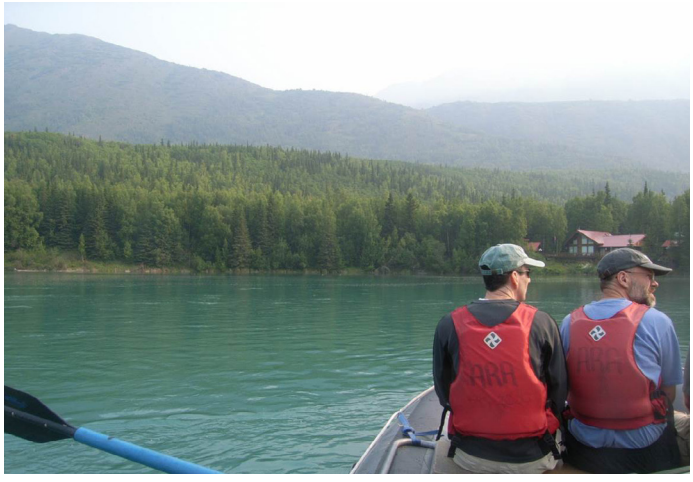
- Kenai River Special Management Area.
- Boat launch and river access areas: Jim's Landing (KNWR), Sportsman's Landing/Russian River Ferry (State and KNWR), and Cooper Landing Boat Launch and Day Use Area (State).
- Trails: Resurrection Pass National Recreation Trail, Bean Creek Trail, and Stetson Creek Trail (Chugach National Forest); Fuller Lakes Trail (KNWR); and informal trails such as the Art Anderson Slaughter Gulch Trail.
- Forest Service campgrounds: Russian River Campground and Cooper Creek Campground.
- Forest Service areas set aside for recreation: Kenai River Recreation Area, Juneau Falls Recreation Area, and Lower Russian Lake Recreation Area.

The main area of activity and land protected for recreation purposes is the central 4-mile river corridor between the confluence of Cooper Creek with the Kenai River (near existing highway MP 51) and the confluence of the Russian River with the Kenai River (near MP 55). Many park and recreation properties are centered in a core area along the river and loosely function together and are managed similarly, even though the different types of properties are managed by different entities. The Kenai River and the adjacent Kenai River Recreation Area, together with Sportsman's Landing, the Russian River Ferry, the Russian River Campground, the Lower Russian Lake Recreation Area, and the Cooper Creek Campground all are contiguous park, recreation, and refuge lands and waters comprising well over 700 acres. In addition, the K'Beq Footprints Heritage Site and the trailheads for the Resurrection Pass Trail, Russian Lakes Trail, and Stetson Creek Trail are located in this area. This area also is the heart of the Sqilantnu Archaeological District and Confluence Traditional Cultural Property.

The Juneau Falls Recreation Area (320 acres), Resurrection Pass Trail corridor (1,000 feet wide), and Bean Creek Trail corridor form a similar block of recreation properties on a smaller scale at the head of Juneau Creek Canyon. All are U.S. Forest Service properties.

Personal-use and commercial recreation use levels are high, with "combat fishing" a common term for elbow-to-elbow sportfishing near the Russian and Kenai rivers confluence. Thousands of float trips occur on the Kenai River each summer. The campgrounds and trails also are well used, and use of trails continues year round (for snowmobiles and skiing in winter). The Resurrection Pass Trail is 38 miles long and connects to the Hope area, with several side trails and backcountry public use cabins.

Most of the park and recreation properties are protected under Section 4(f) transportation law (see box, next page). However, a few are not because they are not publicly owned, not maintained or managed by any agency, or otherwise not significant as park or recreation facilities.



Key Impacts/Issues:

- All alternatives would use land from various park and recreation properties.
- The Cooper Creek Alternative would truncate the lower end of Stetson Creek Trail, which is a recreational and historic trail. The project would construct a new pullout trailhead at the terminus of the truncated trail and make over the old trailhead area into an interpretive loop trail for Cooper Creek Campground.
- The G South Alternative is considered to have the greatest impacts to the Kenai River (a designated park unit), primarily because it would add a new bridge over the Kenai River. New bridges are counter to the Kenai River Comprehensive Management Plan.

» Both the Cooper Creek and G South alternatives would continue to follow the existing alignment through the 4-mile core recreational area along the river. Thus, all traffic would remain in this area instead of being routed around it.

» The Juneau Creek and Juneau Creek Variant alternatives would impact the Resurrection Pass Trail with a crossing 3.4 miles north of the trail's southern terminus. The bridge over Juneau Creek Canyon would span the Resurrection Pass Trail, minimizing impact, but the backcountry atmosphere of the trail and Juneau Falls Recreation Area in this location would change to a more "front-country" experience, with greater use. Under these two alternatives, 70 percent of Sterling Highway traffic is expected to use the new highway, leaving the old highway through the 4-mile core area (Cooper Creek to Russian River) as a quieter, winding, lower-speed, local road suited to providing access to that area's multiple recreational amenities.

Mitigation Measures:

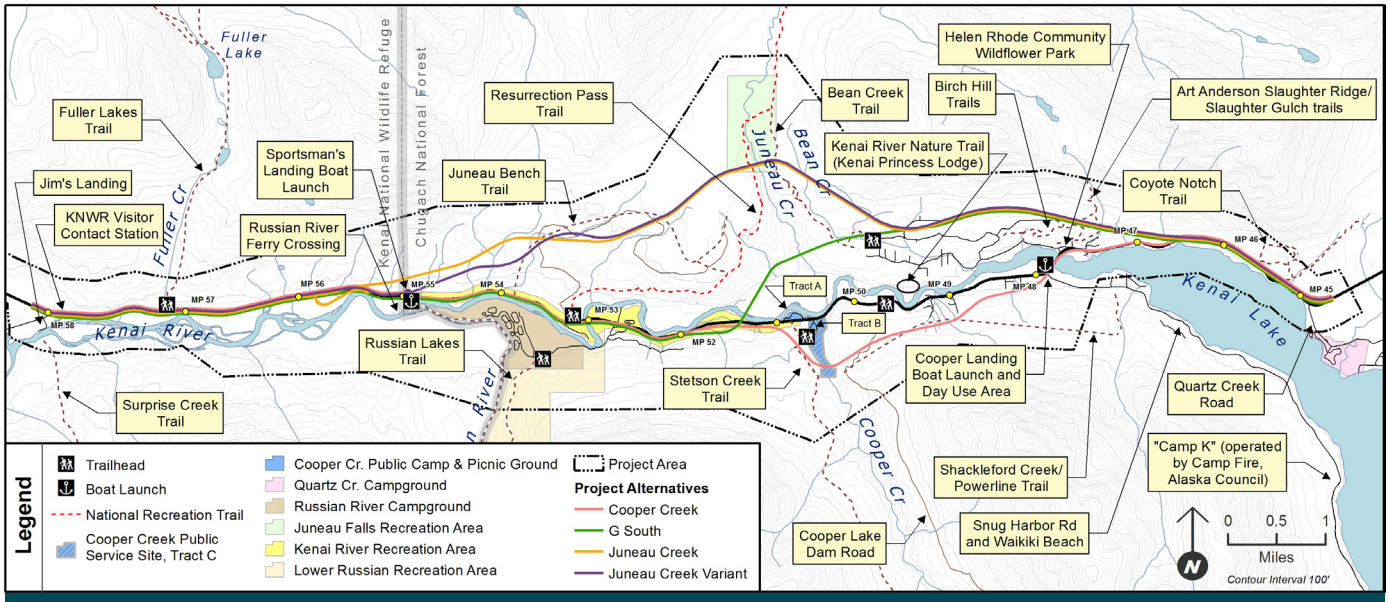
Substantial mitigation is proposed for impacts to recreation areas. These are spelled out in the Section 4(f) Evaluation, in section 4.7 of the SEIS. Mitigation proposed includes new parking and trailheads for Stetson Creek Trail, Bean Creek Trail, and Resurrection Pass Trail where alternatives cross the trail and addition of new connecting trails or re-routed trails where necessary. Underpasses would be created where an alternative would cross certain existing unimproved roads used as trails—the Cooper Lake Dam Road, extension of Slaughter Ridge Road, and West Juneau Road. Under the two Juneau Creek alternatives, a falls overlook would be added in the Juneau Falls Recreation area, and a pedestrian walkway would be added to the highway bridge to connect trails on either side of the canyon. For these alternatives, DOT&PF has accepted the Forest Service's suggestion to compensate for impacts to the long-distance experience on the Resurrection Pass Trail by providing a new connection for another long-distance trail nearby in the Kenai River watershed—the Iditarod National Historic Trail. DOT&PF would commit to providing a pedestrian crossing of the Snow River bridges at the opposite end of Kenai Lake to accommodate the Iditarod commemorative trail.

What is Section 4(f)?

Section 4(f) of the Federal Department of Transportation Act prohibits use of certain parks, recreation areas, wildlife refuges, or historic properties for transportation projects unless there is "no prudent and feasible alternative" or the impacts are "de minimis." The Draft SEIS evaluates Section 4(f) resources, the impacts of the proposed alternatives, alternatives that could avoid use of Section 4(f) resources, and all possible measures to minimize harm to these resources. If there is no prudent and feasible avoidance alternative, FHWA must select the alternative with the least overall harm. See Chapter 4 of the SEIS.

Where do I look in the Draft SEIS?

The Draft SEIS addresses park and recreation resources in Section 3.8. Chapter 4 also extensively addresses park and recreation areas determined to be Section 4(f) resources.



Project area park and recreation resources

Historic and Archaeological Resources

Historic, archaeological, and other cultural properties in the project area that are eligible for the National Register of Historic Places include:

- Prehistoric archaeological sites associated with Alaska Native cultures.
- Historic sites associated principally with gold prospectors and settlement of the area by Russians and Americans from outside Alaska, including the Bean Creek Trail and Stetson Creek Trail.
- Traditional Cultural Properties (TCPs)—areas of cultural importance to the Kenaitze Indian Tribe.

The Sqilantnu Archaeological District encompasses most of the project area and both sides of the Kenai River valley up to an elevation of about 1,000 feet. This district is recognized in Federal law under the Russian River Land Act. Most other historic properties, including two historic mining districts, two TCPs, and portions of the historic trails, overlap with the Sqilantnu District. Hundreds of archaeological sites, comprised collectively of thousands of individual archaeological features, contribute to the district. The TCPs are individually eligible for the National Register of Historic Places and also contribute to the Sqilantnu District. While the cultural and archaeological features are not well known to the general public, the area is considered quite important by the Kenaitze Indian Tribe, CIRI, the Chugach National Forest, the KNWR, and the State of Alaska's Office of History and Archaeology. There is potential for future nomination of the area as a National Historic Landmark. All cultural and historic properties eligible for the National Register of Historic Places are considered to be protected by Section 4(f) (see box on the previous page).

Key Impacts/Issues:

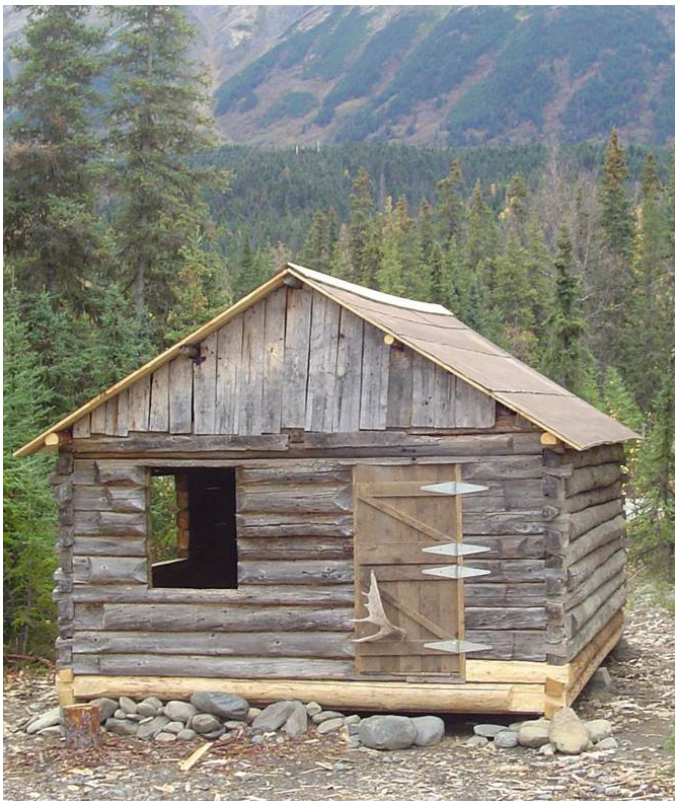
- The Cooper Creek and G South alternatives pass directly through an area of overlapping historic and archaeological districts and TCPs. However, they mostly overlap the existing highway corridor. In general, the Cooper Creek and G South alternatives are similar in their effects. See the large summary table at the end of this document.
- The Juneau Creek and Juneau Creek Variant alternatives follow similar alignments and generally have fewer impacts to known cultural sites than the other two alternatives. The Juneau Creek Alternative would affect the least acreage and the fewest archaeological properties of any of the alternatives. The Juneau Creek Variant Alternative, designed to avoid use of the KNWR/Wilderness, would intersect the existing Sterling Highway at the confluence of the Kenai and Russian rivers in the heart of the Confluence TCP and Sqilantnu Archaeological District. It would therefore have greater impact to culturally important sites than the Juneau Creek Alternative, including proximity to human burials, although it would impact fewer sites than the Cooper Creek and G South alternatives.

Mitigation Measures:

Substantial mitigation for effects to adversely affected historic properties is expected. An agreement to be spelled out among tribal entities and agencies (consulting parties) will be presented in the Final EIS.

Where do I look in the Draft SEIS?

The Draft SEIS addresses cultural and archaeological resources and impacts in Section 3.9. Chapter 4 also addresses these topics as Section 4(f) resources.



Noise

Much of the project area away from the existing highway is generally quiet, consisting of natural areas, with running water and wind being the primary contributions to base sound levels. Noise measurements were taken at key sensitive locations (receptors) throughout the project area as a baseline, and sound levels were computer-modeled to forecast noise increases from traffic on the alternatives.

Key Impacts/Issues:

All build alternatives would create noise that would substantially increase noise levels and/or exceed noise abatement criteria. Forecast increases in traffic would result in increased noise levels even under the No Build Alternative, which would impact three more sensitive receptors than are impacted today. Only the Cooper Creek Alternative, which would impact five more properties than are impacted today, would have noise impacts at more sensitive noise receptors than the No Build Alternative.

Mitigation Measures:

DOT&PF examined the ability to mitigate permanent noise impacts with walls or barriers and could not find a way to make them effective given either the large land areas that are sensitive or the need to accommodate driveways (i.e., necessitating a break in the noise barrier). As a result, no noise walls, berms, or barriers are proposed.

Visual Resources

The glacially carved Kenai River valley frames the visual environment of the project area. Steep mountains and the unique turquoise color of Kenai Lake and the Kenai River are the predominant features seen from the project area. Canyons formed by Juneau Creek and Cooper Creek, tributaries of the Kenai River, notch the north and south sides of the main valley. The Sterling Highway is recognized as a State Scenic Byway because of its scenery, history, and recreational opportunities. Foreground views are of riparian forest and human development; mountain uplands and peaks can be seen in the background. The view of Cooper Landing is mainly of single-story small, framed (and sometimes log) residential and commercial buildings. The project identified key views and rated them using a formal process (Visual Quality Evaluation). The evaluation identified mostly moderate to high ratings for the existing visual environment.

Key Impacts/Issues:

All alternatives would adversely affect the visual environment but also would provide new views. Negative change in Visual Quality Evaluation scores would be highest under the Juneau Creek Variant Alternative, followed by the Juneau Creek, Cooper Creek, and G South alternatives with progressively fewer adverse changes in visual quality.

Mitigation Measures:

No specific mitigation for visual impacts is proposed. However, as part of the standard design, all cuts and fills would be constructed with care, and bare soils would be seeded for quick greening of the landscape. Large new bridges under all alternatives would be designed with aesthetics in mind for recreationists passing near or under the bridge on trails or in boats.

Where do I look in the Draft SEIS for Noise?
The Draft SEIS addresses noise in Section 3.15. A Noise Analysis report is also available on the project web site and is published in the SEIS as Appendix D.

Where do I look in the Draft SEIS for Visual Resources?
The Draft SEIS addresses visual resources in Section 3.16. A Visual Analysis report is available on the project web site.

Wetlands and Vegetation

The project area is vegetated with natural vegetation. It has been substantially modified in developed areas in and around Cooper Landing and at recreation developments. Multiple types of wetlands exist in the project area, from forested wetlands to ponds along the Kenai River to open, unforested wetlands. Wetlands and vegetation in general perform important functions, from wildlife habitat to floodwater retention. The U.S. Army Corps of Engineers (Corps) is a cooperating agency for this SEIS and must issue a permit for any fill to be placed in wetlands or other waters. The SEIS aids the Corps' decision-making process.

Key Impacts/Issues:

- All build alternatives would permanently eliminate wetlands. However, there would be substantial differences among the alternatives, with the Cooper Creek Alternative having relatively low impacts compared to the two Juneau Creek alternatives. These two alternatives would result in more than 3 times the total area of wetland loss of the Cooper Creek Alternative, including 6 times as much loss of emergent wetlands and nearly 12 times as much loss of forested wetlands. The G South Alternative would have intermediate wetland impacts.
- All alternatives would permanently eliminate vegetation. Again, the Cooper Creek Alternative would affect the least, the Juneau Creek alternatives the most. See the Impacts and Benefits Summary tables at the back of this document.

Where do I look in the Draft SEIS?
The Draft SEIS addresses wetlands and vegetation in Section 3.20. A wetlands report is available on the project web site.

Mitigation Measures:

The alternatives were developed to avoid and minimize impacts to wetlands and other waters. Where it was not practical to avoid impacts altogether, the SEIS contains a description of construction-related best management practices that would be followed to minimize impacts to wetlands and vegetation. DOT&PF has committed to paying a fee (in-lieu of creating or enhancing wetlands) to a land conservation organization that would use the funds for protection or enhancement of wetlands in a critical location on the Kenai Peninsula. This fee would be meant to compensate for the unavoidable impacts to wetlands and waters of the U.S. and to offset wetland loss.

Fish and Essential Fish Habitat

Fish habitat and water quality are related discussions, but appear separately in the SEIS. This section addresses both in describing fish and impacts to fish habitat.

The Kenai River ecosystem is a productive, diverse system that supports a wide variety of resident fish and fish that travel between freshwater and saltwater ("anadromous" fish) species. Major water bodies within the project area include Kenai Lake, Kenai River, Bean Creek, Juneau Creek, Cooper Creek, Russian River, and Fuller Creek. The project area contains important fish migration corridors. Kenai River fisheries for king (Chinook), sockeye (red), and coho (silver) salmon are the largest freshwater sport fisheries for these species in Alaska. More than one million sockeye salmon return each year to spawn in the Kenai and Russian rivers. Sockeye, Chinook, coho, and pink salmon all spawn in the upper reaches of the Kenai River, and chum salmon are also present.

The entirety of the Kenai River and its tributaries, where used by salmon, are designated essential fish habitat (EFH). EFH designations emphasize the importance of habitat protection to healthy fisheries. Water quality in the Kenai River and its tributaries within the project area is considered good. Downstream parts of the river have, in the recent past, been considered polluted with hydrocarbons from outboard motor use, but 2008 regulatory changes improved the water quality. Outboard motors are not allowed on the river in most of the project area, but are allowed on Kenai Lake and at its outlet in Cooper Landing.

A consistent theme in public comments has been concern about maintaining water quality and salmon habitat, including concerns about the risk of spills from the current highway and the problems with its design.

Key Impacts/Issues:

- All build alternatives would result in an increase in storm water runoff because the project area would have more paved surfaces—a wider highway where rebuilt, and all-new highway in the segments built on a new alignment. Impacts from storm water runoff would not be substantial enough to impact wells and wellhead protection areas or fish in the rivers.
- Each build alternative would move the majority of vehicle traffic away from the Kenai River along those segments built on new alignment. This would reduce the risk of spills and general runoff pollution reaching the river. The Juneau Creek and Juneau Creek Variant alternatives would divert traffic from the river over the greatest road length, and the Cooper Creek Alternative would divert the least amount of traffic away from the river. While the Cooper Creek Alternative would divert the least amount of traffic of all the build alternatives, it would be an improvement over the No Build Alternative and result in a reduction of risk over the existing conditions.
- Direct impacts on water bodies, water quality, and fish habitat would result from new and replacement bridges and culverts and from new roadway embankment placed in water bodies. New culvert crossings and bridge crossings would be likely to alter natural flow patterns and habitat in streams at the location of the crossings, and possibly upstream and downstream. The Cooper Creek and G South alternatives would involve substantial construction in the Kenai River to replace existing bridges and build new bridges. The Juneau Creek and Juneau Creek Variant alternatives would have no bridge construction in the Kenai River. All alternatives would include a segment of reconstructed highway at the western end of the project where rip-rap (rock) would be placed in the edge of the Kenai River, where the existing highway already is adjacent to the river.

Mitigation Measures:

Mitigation measures would be implemented during the construction process to minimize impacts to water quality from runoff and fuel. Construction timing windows would ensure that construction in the water (principally bridge construction) would occur outside of critical times in the salmon life cycle. New culverts and replacement culverts would be designed to modern fish passage standards wherever fish use those drainages. Where existing culverts do not allow fish to pass, replacements culverts would improve habitat availability for fish. These efforts would reduce impacts to fish habitat and water quality. Permanent impacts would be minimized by commitments to maintain or reduce the number of in-water piers for any replacement bridge.

Where do I look in the Draft SEIS?

- Water Bodies and Water Quality: Section 3.13
- Fish/Essential Fish Habitat: Section 3.21
- Kenai River Special Management Area description: Section 4.2.2
- Kenai River Special Management Area impacts: Section 4.5

A separate Essential Fish Habitat report is also published on the project website at www.sterlinghighway.net.

Wildlife

More than 175 species of mammals, birds, and amphibians live in, seasonally use, or visit the Kenai River basin. Brown bears and moose are two of nine species selected for in-depth analysis in the SEIS because of their status with State and Federal agencies and because of their susceptibility to project impacts.

The population of brown bears for the entire Kenai Peninsula appears to have approximately equal numbers of males and females and dependent young. Brown bears on the Kenai Peninsula use a wide variety of habitats, including rivers and

streams, forests, and subalpine and alpine areas, and generally avoid areas in proximity to roads. The general area between MP 45 and 60 is in a class of habitat with medium to high probability of use by both lone adult females and females with cubs during spring and summer. Brown bears likely move back and forth in a northwest-southeast direction over the Kenai Mountains and across the Kenai River within the project area between MP 45-55, with the area just west of Cooper Landing near Juneau Creek identified by wildlife managers as an important "linkage" zone.

The largest cause of bear deaths on the Kenai Peninsula is bears killed in defense of life and property (DLP kills), which appears to be closely associated with increasing human population, development, and activity on the Peninsula. The rate of deaths of female brown bears on the Kenai Peninsula has consistently been higher than management objectives expressed by the Alaska Department of Fish and Game.

Moose are a common and important species in the project area, providing many viewing opportunities to residents and tourists, as well as subsistence and sport hunting. Collisions with automobiles on the Sterling Highway are common, and present a risk to individual animals and to motorists. Portions of the MP 45-60 area include rutting, wintering, and enhanced feeding habitat for moose, and north-south wildlife movement corridors through the project area are considered important. The moose population is slowly declining. The factors most greatly affecting the moose population on the Kenai Peninsula are considered to be declining habitat quality, predation, weather, and mortality caused by vehicle collisions.

Key Impacts/Issues:

» All of the build alternatives would affect brown bears and moose due to habitat loss, habitat fragmentation, and decrease in habitat quality; changes in behavior to avoid the new highway; and potential injury or mortality from vehicle collisions.

» None of the alternatives would induce further residential or business development more than would be anticipated under the No Build Alternative because of DOT&PF's decision to prohibit access from new sections of adjacent property. By not inducing new growth (and potentially increasing DLP kills), indirect impacts to bears and other mammals would be minimized.

» The Juneau Creek and Juneau Creek Variant alternatives would have the greatest impact on wildlife habitat, because they have the longest lengths of highway built on a new alignment, resulting in larger areas of new effects to habitat.

Mitigation Measures:

DOT&PF is sponsoring a wildlife movement study, in consultation with wildlife management agencies. Results of this study, which began in 2014, are expected to aid in the placement of one or more wildlife crossings and other measures to accommodate wildlife movement across the highway for brown bears, moose, and other species. In the Final SEIS, DOT&PF hopes to have more detail on how many, what kind, and locations of potential wildlife crossings and other recommended measures.

Where do I look in the Draft SEIS?
Wildlife: Section 3.22.

Coordination

The basic requirement of the National Environmental Policy Act is that the Federal government must involve the public and agencies in its project decision-making process. The Act ensures a process of disclosing impacts to the public and incorporating public input before any decision is made.

A primary component of the Sterling Highway MP 45–60 Project has been involvement of key stakeholders and the consideration of their comments and concerns. Chapter 5 of the SEIS summarizes the coordination process conducted during development of the Draft SEIS, including tribal consultation under Section 106 of the National Historic Preservation Act. Chapter 5 of the SEIS also includes a summary of key issues and pertinent information received from the public, Alaska Native tribes and corporations, and government agencies. The coordination process will continue through the final decision.

How much has the public been involved in the project?

The Draft SEIS summarizes a long public and agency coordination process, including initial efforts to determine the scope of the SEIS inquiry ("scoping") and many follow-up meetings with stakeholder groups, the public, and agencies on multiple topics. Key topics that have included substantial coordination are:

- Alternatives screening and selection.
- Section 106 (cultural properties).
- Section 4(f) (park, refuge, recreation, and cultural properties).
- Bears, moose, and other wildlife impacts.
- Business and community impacts.
- ANILCA Title XI process for the Resurrection Pass National Recreation Trail and KNWR.
- Mitigation of impacts.

Scoping began in 2000 and included several kinds of meetings over several years:

- Agency Consultation Committee (six meetings).
- Individual stakeholder interviews (14 agency interviews; five public interviews).
- Stakeholder Sounding Board (five meetings for more than 60 invited groups).
- Public Listening Posts (four rounds of listening posts for a total of nine events in Cooper Landing, Soldotna, and Anchorage).

A web site (www.sterlinghighway.net), internet survey, mailing list, newsletters, and press releases were included. Public and agency input has continued as the Draft SEIS has taken shape, including public comment taken on the alternatives screening before some alternatives were dropped from further consideration. Agencies have been involved heavily regarding impacts and mitigation. From 2002 to 2014, there have been:

- 35 agency meetings on topics such as wildlife, recreation impacts, land issues, and Section 4(f).
- An additional 13 meetings with tribal entities and agencies regarding cultural resources to define new boundaries for the Sqilantnu Archaeological District, define for the first time two traditional cultural properties, define the boundaries of historic mining districts, and determine impacts to cultural properties.

These consultations have been valuable in sorting out the complex issues involved in the project and have formed the basis for much of the analysis in the EIS. Such coordination with the public and agencies will continue as the project moves forward.

Next Steps

Now that the Draft SEIS has been issued for public and agency review, the anticipated next steps are to respond to comments and revise the SEIS, identify a Preferred Alternative, and issue a Final EIS for review and comment. When the environmental process is complete, the FHWA will issue a Record of Decision. Your comments and input are important to the process.

The public and agencies are encouraged to review the Draft SEIS, accompanying appendices, and technical reports are available for review online at www.sterlinghighway.net. Printed copies of the documents are available for public review at the following locations:

Kenai Peninsula

» Cooper Landing Community Library, Mile 0.8 Bean Creek Road
» Kenai Community Library, 163 Main Street Loop
» Soldotna Public Library, 235 N. Binkley Street

Anchorage

» Z.J. Loussac Library (Alaska Collection), 3600 Denali Street
» Alaska Resources Library and Public Information Services (ARLIS), 3211 Providence Drive
» DOT&PF Central Region, 4111 Aviation Avenue

Juneau

» Alaska State Library, 333 Willoughby Avenue
» FHWA AK Division, 709 W. 9th Street, Room 851

Washington DC

» Martin Luther King Jr. Central Library, 901 G Street NW, 3rd Floor

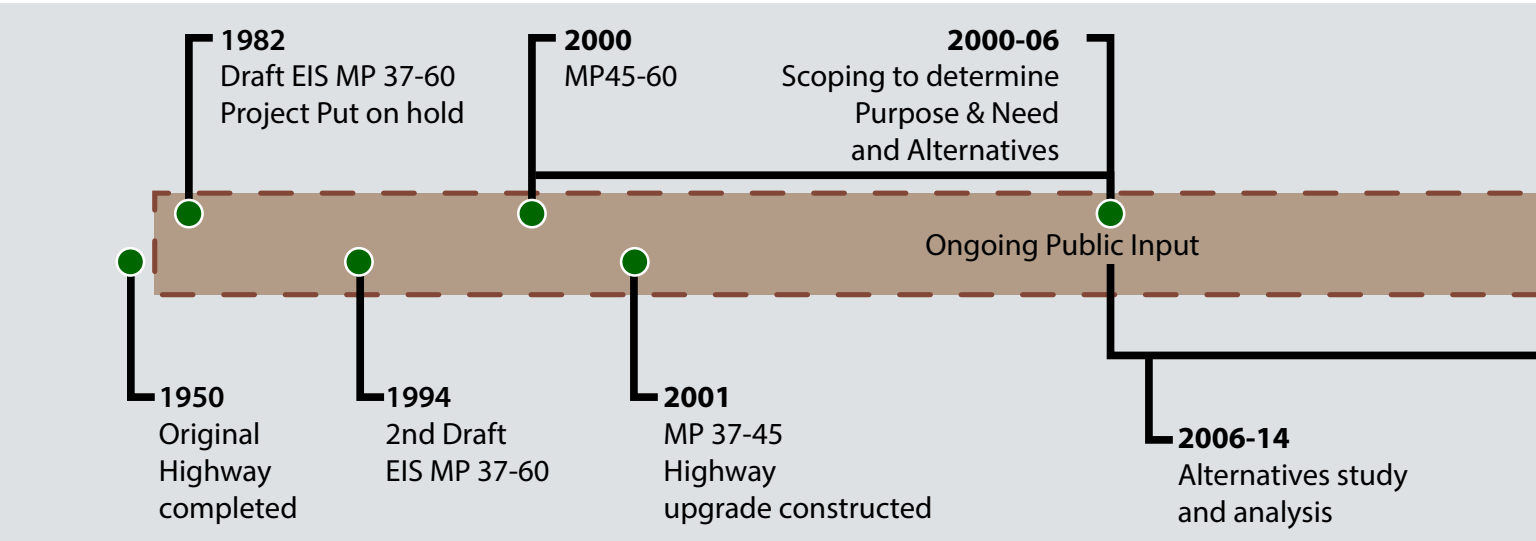
To request a CD copy of the full Draft SEIS, send an email to sterlinghwy@hdrinc.com.

Opinions and preferences regarding the alternatives are appreciated and noted; however, the most helpful comments are those that provide new information, identify a new issue, identify a flaw or gap in analysis, or identify unexplored lines of research that could materially alter the assessment of impacts.

Comments can be submitted:

» **Preferred method:** online at www.sterlinghighway.net
» **Standard mail**:
Brian Elliott, Environmental Manager
DOT&PF Central Region
Sterling Highway MP 45-60 Project
PO Box 196900
Anchorage, AK 99519-6900
» **Email:** sterlinghwy@hdrinc.com
» **In person:** at project open house/public hearings

Please visit the project website, www.sterlinghighway.net, for up-to-date project details, public open house and public hearing notifications, and comment deadlines.



What happens with my comments?

Some EISs receive many, many comments, and processing them takes time. Comments are categorized by topic in a database, and the entire email or letter is captured electronically for context. DOT&PF and FHWA will consider all comments and write responses. Comments frequently result in changes to the analysis in an EIS. Text clarifications are common. Sometimes comments result in new or modified environmental analyses or new measures proposed to mitigate impacts. A summary of comments and responses will be appended to the Final SEIS to document the comments and record how each was addressed.

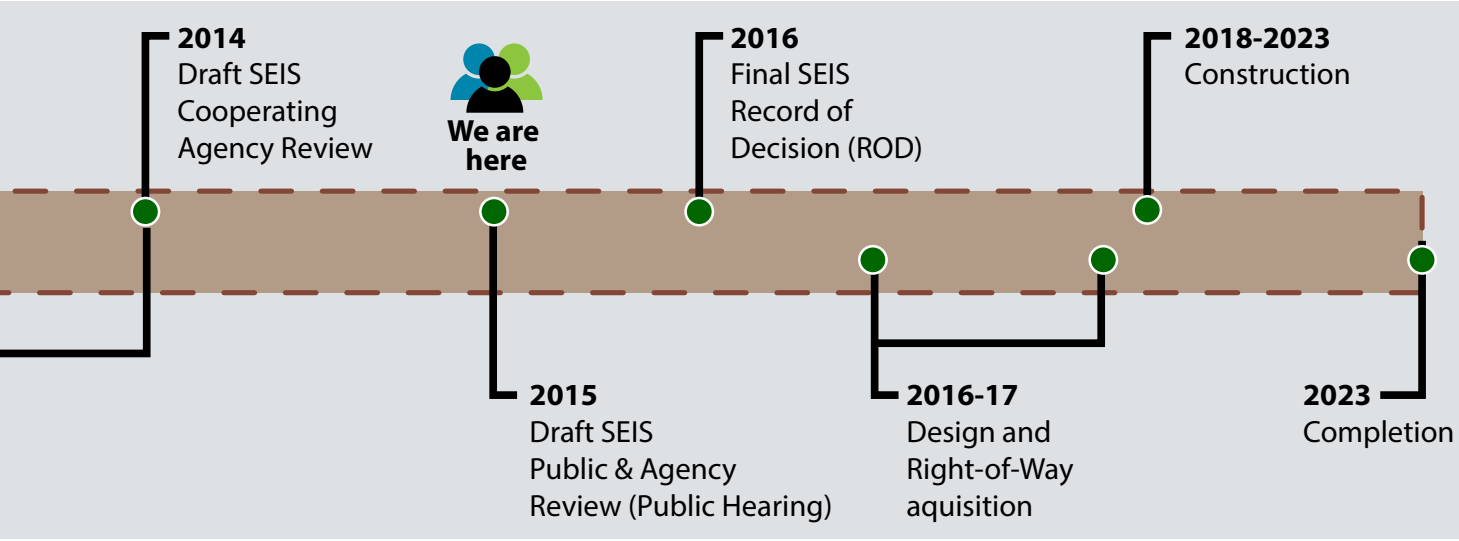
Who makes the final decision?

The FHWA is the lead Federal agency for the SEIS and makes the final decision about selection of an alternative. This decision is made in conjunction with the DOT&PF. Other Federal agencies have their own authorizations, including permits for fill in wetlands and water bodies and land transfer authorizations. Those agencies will also use this SEIS and your comments in making their decisions.

When will something be built?

If a build alternative is selected, the project will enter the design phase following publication of the Final SEIS and signing of a Record of Decision. The earliest construction could start is 2018; however, that is dependent on the availability of funding.

Project Timeline



Impacts and Benefits Table

The "Affected Environment and Environmental Consequences" section of this Executive Summary discusses key impact topics, with references to the tables that follow specific numerical impact data. These tables cover the key topics addressed earlier in this Executive Summary and all other resource topics analyzed in the Draft SEIS.

The tables present impacts of the alternatives side-by-side for comparison. Dividing bars that run horizontal across the table identify each resource by the same heading and section number used in the Draft SEIS. Readers may refer directly to that section of the SEIS for context and greater detail. A few sections of the Draft SEIS are not presented in these tables: sections 3.24 Permits; 3.25 Short-Term Uses vs. Long-Term Productivity; 3.26 Irreversible and Irretrievable Commitments of Resources; and 3.27 Cumulative Impacts. Please see the full Draft SEIS to learn about those topics.

Impact Category		Impacts and Benefits								
		No Build Alternative	Cooper Creek Alternative		G South Alternative		Juneau Creek Alternative		Juneau Creek Variant Alternative	
3.1 Land Ownership and Land Use										
Land Ownership *(acres, % in project area)*	Federal *(9,008)*	No impact	54	<1%	90	1%	167	2%	115	1%
	State *(1,720)*		9	<1%	43	3%	90	5%	92	5%
	Borough *(2,013)*		93	5%	126	6%	129	6%	129	6%
	Native *(61)*		1	2%	1	2%	-	-	12	19%
	Private *(698)*		57	8%	<1	<1%	<1	<1%	<1	<1%
	Total *(13,500)*		214	2%	261	2%	387	3%	349	3%
Land Use *(acres, % in project area)*	Commercial *(103)*	No impact	1	1%	-	-	-	-	-	-
	Institutional *(58)*		<2	2%	-	-	-	-	-	-
	Residential *(548)*		41	8%	<2	<1%	<2	<1%	<2	<1%
	Vacant *(12,791)*		170	1%	260	2%	385	3%	347	3%
	Total *(13,500)*		214	2%	261	2%	387	3%	349	3%
3.2 Land Use Plans and Policies										
Kenai National Wildlife Refuge Comprehensive Conservation Plan		No impact	No KNWR land would be acquired, developed, or directly used as a result of the Cooper Creek Alternative outside the existing highway right-of-way.		No KNWR land would be acquired, developed, or directly used as a result of the G South Alternative outside the existing highway right-of-way.		New transportation right-of-way across a corner of the KNWR Mystery Creek Wilderness unit and the KNWR Intensive Management area would be needed. The process would require approval by the President of the United States and then a joint resolution of Congress.		No KNWR land would be acquired, developed, or directly used as a result of the Juneau Creek Variant Alternative outside the existing highway right-of-way.	

Impact Category		Impacts and Benefits				
		No Build Alternative	Cooper Creek Alternative	G South Alternative	Juneau Creek Alternative	Juneau Creek Variant Alternative
3.2 Land Use Plans and Policies continued...						
Chugach National Forest		No impact	Alignment is within the Fish, Wildlife and Recreation and the Major Transportation/ Utility Systems management area prescriptions.	Alignment is within the Fish, Wildlife and Recreation; Fish and Wildlife Conservation; and the Major Transportation/ Utility Systems management area prescriptions.	Alignment is within the Fish, Wildlife and Recreation; Major Transportation/ Utility Systems; Fish and Wildlife Conservation; and Backcountry management area prescriptions.	Alignment is within the Fish, Wildlife and Recreation; Major Transportation/Utility Systems; Fish and Wildlife Conservation; and Backcountry management area prescriptions.
National Forest Inventoried Roadless Area Lands *(acres of right-of-way, miles traversed)*		No impact	3.8 acres 0.1 mile	48.4 acres 1.1 miles	127.5 acres 3.3 miles	96 acres 2.4 miles
ANILCA Title XI *(conservation system units affected)*		No impact	No impact	No impact	The Juneau Creek Alternative would cross Resurrection Pass Trail and would cross a corner of the Mystery Creek Wilderness unit within the KNWR.	The Juneau Creek Variant Alternative would cross Resurrection Pass Trail.
State Plans		No impact	The build alternatives, to differing extents, meet the recommendation of the Kenai River Comprehensive Management Plan that new public road construction be located away from the Kenai River.			
Borough Plans and Other Pertinent Plans						
Consistency with planning documents		No impact	May require Kenai Borough Comprehensive Plan amendment.	May require Kenai Borough Comprehensive Plan amendment.	Consistent with Kenai Borough Comprehensive Plan.	
3.3 Social Environment						
Social Environment		Traffic congestion would make travel and social interaction within the community more difficult.	Change in local traffic patterns and community character through re-routing of traffic, less change for the Cooper Creek Alternative, more for the G South, Juneau Creek, and Juneau Creek Variant alternatives.			
3.4 Housing and Relocation						
Private and Native Property Impacts and Relocations *(number of affected parcels)*	**Private**	No impact	38	4	4	4
	Full Parcel	-	16 *(8 residential properties and approximately 14 people relocated.)*	0 *(0 relocations)*	0 *(0 relocations)*	0 *(0 relocations)*
	Part of Parcel	-	22	4	4	4
	Native Corporation (CIRI)	-	2	2	0	1
	Full Parcel	-	0	0	0	0
	Part of Parcel	-	2	2	0	1

Impacts and Benefits Table continued...

Impact Category	Impacts and Benefits				
	No Build Alternative	Cooper Creek Alternative	G South Alternative	Juneau Creek Alternative	Juneau Creek Variant Alternative
3.5 Economic Environment					
Tax Base/Business Impacts	No impact	Would not result in any business relocations. All traffic would remain routed through a portion of the central commercial area of Cooper Landing. Highway-based businesses would retain benefit of passing traffic. River-based businesses would contend with highway traffic.	Would not result in any business relocations. These alternatives would remove 70 percent of the traffic from all of the central commercial area of Cooper Landing. Thirty percent of the traffic would continue traveling through Cooper Landing on the "old" highway. Beneficial impacts would result from decreased congestion. Adverse impacts would result from reduced spontaneous stops for services.		
Construction Cost	_	**$290.7 million**	**$303.5 million**	**$249.6 million**	**$257.0 million**
O&M and Periodic Major Activities *(over 20 years)*	**$69.7 million**	**$23.7 million**	**$23.8 million**	**$24.2 million**	**$24.3 million**
Operations & Maintenance[a,b]	$4.9 million *($245,500/yr)*	$11.9 million *($593,400/yr)*	$11.7 million *($585,400/yr)*	$12.2 million *($608.600/yr)*	$12.2 million *($611,700/yr)*
Periodic Major Activities[b,c]	$64.8 million	$11.8 million	$12.1 million	$12.0 million	$12.1 million
TOTAL	**$69.7 million**	**$314.4 million**	**$327.3 million**	**$273.8 million**	**$281.3 million**

[a]Operations and maintenance (O&M); includes annual cost such as snow plowing, crack sealing, and other basic maintenance on the alignments.
[b]Values for build alternatives do not account for O&M and Periodic Major Activities on exiting/unimproved highway in the corridor. See Section 3.27, Cumulative Impacts, for those values.
[c]Periodic major activities include projects such as replacement of guardrail and pavement overlays that are reasonably anticipated over a 20-year span.
Note: Numbers are rounded and therefore totals do not add perfectly. All estimates are in 2014 dollars (i.e. future dollars have not been inflated to the future year values)

3.6 Transportation					
Roadway System					
Number of horizontal curves meeting minimum standard for 60 mph/total number curves	22 / 43	27 / 27	25 / 25	21 / 21	22 / 22
Percent of length above maximum grade *(>6% grade)*	0	0	0	0	0
Percent of length at 5.9 – 6% grade *(steep)*	0	9	8	2	0
Percent of length >5% grade *(hilly)*	-	9	14	16	26
Percent of length that meets clear zone standards	7	100	100	100	100
Percent of length that meets standards for shoulder width	0	100	100	100	100
Percent of length with passing lanes	0	29	26	42	39
Number of intersections of side roads and driveways	75	42	20	11	11

Impact Category		Impacts and Benefits				
		No Build Alternative	Cooper Creek Alternative	G South Alternative	Juneau Creek Alternative	Juneau Creek Variant Alternative
3.6 Transportation continued...						
Travel Patterns		No change	This alternative would remove 70% of traffic from a portion of the central commercial area of Cooper Landing *(MP 47-48)* but would retain all traffic in the MP 48-50 portion. No change in overall traffic volumes.	This alternative would remove 70% of all traffic from all of the central commercial area of Cooper Landing *(approximately MP 47 to 50)*. No change in overall traffic volumes.	These alternatives would remove 70% of all traffic from all of the central commercial area of Cooper Landing *(approximately MP 47 to 50)* and from the primary recreation corridor *(approximately MP 50 to 55)*. No change in overall traffic volumes.	
Accessibility		No change	Under this alternative, getting on and off the highway would remain difficult at some times because all traffic would remain in town in the MP 47-48 area.	Under these alternatives, accessibility for Cooper Landing businesses and residents along the "Old Sterling Highway" is expected to improve because traffic would be reduced in this area.		
Traffic Level of Service in 2043 at LOS C or Better *(% of road length, including both directions of travel)*		0%	61%	69%	83%	82%
Crash Rate Reduction		No improvement. Potential increase in crash rate.	65% reduction	65% reduction	65% reduction	65% reduction
Aviation, Pedestrians, and Bicyclists		No impact	No impact to aviation. Pedestrians and bicyclists would benefit from wider shoulders on the new highway and decreased traffic on the existing *("old")* highway.			
Pullouts	Pullouts eliminated *(of 24 existing)*	No impact	16	12	4	4
	New pullouts/ parking areas provided	No impact	1 *(Stetson Creek Trail pullout)*	2 *(Bean Creel Trail pullout and parking lot)*	2 *(Bean Creek Trail pullout; trailhead parking lot for Resurrection Pass Trail)*	
3.7 River Navigation						
River Navigation		No impact	The proposed bridge structures to be built would not result in any permanent new impacts to river navigation.	The new Kenai River bridge would be a new structure to navigate, but would be built with adequate clearance.	No new or replacement structures over any navigable waterways. No impact to river navigation.	

Impacts and Benefits Table continued...

Impact Category	Impacts and Benefits				
	No Build Alternative	Cooper Creek Alternative	G South Alternative	Juneau Creek Alternative	Juneau Creek Variant Alternative
3.8 Parks and Recreation Resources					
Park and Recreation Resources					
Recreation Resources Affected	No impact	Kenai River Special Management Area — Cooper Landing Boat Launch and Day Use Area — Kenai River Recreation Area — Sportsman's Landing *(temporary occupancy during construction only)* — Stetson Creek Trail — Cooper Lake Dam Road/Powerline Trail *(crossed with bridge)*	Kenai River Special Management Area — Kenai River Recreation Area — Sportsman's Landing *(temporary occupancy during construction only)* — Bean Creek Trail *(rerouted, crossed with bridge)* — Birch Ridge Trail *(shortened)* — Art Anderson/ Slaughter Gulch Trail *(shortened)*	Kenai National Wildlife Refuge and Wilderness — Resurrection Pass Trail *(crossed with bridge, added new trailhead)* — Bean Creek Trail *(rerouted, crossed with bridge)* — Birch Ridge Trail *(shortened)* — Art Anderson/ Slaughter Gulch Trail *(shortened)* — Juneau Bench Trails *(crossed with grade separation)* — Juneau Falls Recreation Area	Kenai River Recreation Area — Sportsman's Landing boat launch *(temporary occupancy during construction only)* — Resurrection Pass Trail *(crossed with bridge, added new trailhead)* — Bean Creek Trail *(rerouted, crossed with bridge)* — Birch Ridge Trail *(shortened)* — Art Anderson/Slaughter Gulch Trail *(shortened)* — Juneau Bench Trails *(crossed with grade separation)* — Juneau Falls Recreation Area
3.9 Historic and Archaeological Preservation					
Historic Properties Adversely Affected	–	Sqilantnu Archaeological District *(28 contributing properties)* — Confluence Traditional Cultural Property — Charles G. Hubbard Mining Claims Historic District — Kenai Mining and Milling Company Historic District — Stetson Creek Trail	Sqilantnu Archaeological District *(25 contributing properties)* — Confluence Traditional Cultural Property — Charles G. Hubbard Mining Claims Historic District — Bean Creek Trail	Sqilantnu Archaeological District *(JC Alt: 13 contributing properties)* *(JC Variant Alt: 22 contributing properties)* — Confluence Traditional Cultural Property — Bean Creek Trail	
3.10 Subsistence					
Changes in Resources, Resource Habitat, or Competition for Resources	No impact	Changes in both fish and wildlife resources may occur as a result of construction and operation of the build alternatives. Impacts to subsistence and hunting uses in the project area may include wildlife avoiding or reducing use of habitat near the highway, actual loss of habitat within the new alignment, decreased habitat quality, fragmentation of habitat, and injury or mortality of wildlife from collisions or hazardous materials spills.			
Changes in Resource Availability due to Alteration in Resource Migration Patterns or Distribution	No impact	Changes to the landscape caused by project construction can influence wildlife population migration patterns and distribution through habitat loss, changes in habitat suitability, changes in habitat use, or reduced survival. In addition, the highway itself can become a barrier to resource migration patterns through design, such as steep embankments or retaining walls, or through resource injuries or mortality due to collisions.			
Physical or Legal Barriers to Accessing Resources	No impact				

Impact Category	Impacts and Benefits				
	No Build Alternative	Cooper Creek Alternative	G South Alternative	Juneau Creek Alternative	Juneau Creek Variant Alternative
3.11 Utilities					
Utilities	–	Relocates local power poles and underground utility lines along existing alignment. Adds lighting to major intersections. No new utilities proposed along segment built on new alignment. Crossing regional transmission line twice requires raising high voltage power lines and relocating one of the large towers.	Relocates local power poles and underground utility lines along existing alignment. Adds lighting to major intersections. No new utilities proposed along segment built on new alignment.		
3.12 Geology and Topography					
Geology and Topography	No impact	The build alternatives would alter the topography along the roadway corridor through roadway construction, grading, and extraction of sand and gravel for road foundation materials. Bridge construction would require excavations and/or blasting, which would change the topographic contours and remove rock and soils.			
		Unstable soils at large cut east of Cooper Creek may require special treatment/terracing.	No notable soils issue known.	Fractured rock at Juneau Creek canyon bridge site indicates need for extra evaluation for bridge foundations.	
3.13 Water Bodies and Water Quality					
New Bridges	–	**Kenai River** Replacement Cooper Landing Bridge: » 3 to 4 piers Replacement Schooner Bend Bridge: » 2 to 3 piers **Cooper Creek** New Cooper Creek Bridge: » No piers or fill in creek	**Kenai River** New Kenai River Bridge: » 2 to 3 piers Replacement Schooner Bend Bridge: » 2 to 3 piers **Juneau Creek** New Juneau Creek Bridge: » No piers or fill in creek	**Kenai River** No bridges **Juneau Creek** New Juneau Creek Bridge: » No piers or fill in creek	
Drainages	–	57 small drainage crossings: » 47 replacement culverts » 10 new culverts	73 small drainage crossings: » 39 replacement culverts » 32 new culverts *(drainages combined into one culvert where possible)*	63 small drainage crossings: » 20 replacement culverts » 41 new culverts *(drainages combined into one culvert where possible)*	
Longitudinal Encroachments to the Kenai River	No change	5 locations	4 locations	1 location	
Surface Water Quality	No change from existing conditions.	Increase in storm water runoff because the project area would have more paved surfaces. Cooper Creek Alternative would have least new surface area, G South Alternative more, Juneau Creek Variant Alternative more yet, and Juneau Creek Alternative most.			

Impacts and Benefits Table continued...

Impact Category	Impacts and Benefits				
	No Build Alternative	**Cooper Creek Alternative**	**G South Alternative**	**Juneau Creek Alternative**	**Juneau Creek Variant Alternative**
3.14 Air Quality					
Air Quality	No impact to air quality standards. Emissions are higher under congested conditions. Higher emissions likely to be offset in part by higher efficiencies in vehicle fleet nationwide.	No impact to air quality standards. Each of the build alternatives would result in a slight increase in vehicle miles traveled compared to existing conditions. The increase in emissions associated with vehicle miles traveled would be partially offset by increased engine efficiency and reductions in emissions associated with smoothly-flowing traffic. This would vary slightly by alternative, similar to level of service variations (see Section 3.6). Higher efficiencies in vehicle fleet nationwide would also offset increased emissions from vehicle miles traveled.			
3.15 Noise					
Noise (*number of receptors at which noise approaches or exceeds Noise Abatement Criteria, or where a substantial increase is predicted in 2043)*	4 residential 1 recreational **5 total**	4 residential 2 recreational 1 commercial **7 total**	0 residential 2 recreational **2 total**	0 residential 1 recreational **1 total**	0 residential 1 recreational **1 total**
3.16 Visual Environment					
Visual Quality Evaluation	–	All build alternatives have at least moderate impacts as a result of new or updated roadway elements. None of the build alternatives result in impacts that are orders of magnitude different than others.			
3.17 Hazardous Waste Sites and Spills					
Waste Sites	No impact				
Potential Risk of Water Quality Impacts Due to Spills *(percentage of roadway located within 500 feet of the Kenai River, Kenai Lake, Cooper Creek, Juneau Creek, and Russian River)*	77%	56%	45%	25%	26%
3.18 Energy					
Energy	No impact				
3.19 Floodplains					
Floodplains *(acres of encroachment in official mapped floodplain)*	–	5.1 acres	6.2 acres	–	<0.1 acre
3.20 Wetlands and Vegetation					
Wetlands *(acres filled)*	–	11 acres	26.6 acres	38.5 acres	37.5 acres
Vegetation *(acres removed)*	–	188 acres	202 acres	269 acres	256 acres
3.21 Fish and Essential Fish Habitat					
Essential Fish Habitat Impacts *(acres altered; crossings of anadromous fish streams with type of crossing)*	–	1.2 acres/8 crossings: » 4 culverts » 3 bridges » 1 creek re-routed	1.0 acre/8 crossings: » 3 bridges » 5 culverts	0.8 acres/2 crossings: » 1 culvert » 1 bridge	0.8 acres/2 crossings: » 1 culvert » 1 bridge

Impact Category		Impacts and Benefits				
		No Build Alternative	Cooper Creek Alternative	G South Alternative	Juneau Creek Alternative	Juneau Creek Variant Alternative
3.22 Wildlife						
Brown Bear	Habitat Avoidance Area *(acres in addition to the avoidance area created by existing highway)*	_	605 acres	1,468 acres	2,834 acres	2,640 acres
	Quality of habitat loss	_	Impacts Kenai River corridor and bench from Cooper Creek to Russian River Not as intense brown bear use as other streams in the project area	Impacts high-quality brown bear movement and feeding corridors *(along Kenai River and Juneau Creek)*. Alternatives could permanently deter bear movement to, from, and feeding in area.		
	Length of Alternative within Bear Use Area *(miles)*	_	2.7	3.5	4.3	4.4
	Length of double highway barrier to movement within Bear Use Area *(miles)*	_	0.15	0.9	3.9	3.6
Moose	General	_	37 acres	37 acres	59 acres	40 acres
	Rutting	_	100 acres	105 acres	114 acres	116 acres
	Rutting and Winter	_	67 acres	74 acres	104 acres	110 acres
	Total Habitat Lost	_	204 acres	216 acres	277 acres	266 acres
	Length of Alternative within Moose Use Area *(miles)*	_	3.1	3.2	5.1	5.1
	Length of double highway barrier to movement within Moose Use Area *(miles)*	_	_	0.2	4.4	4.1
Bald Eagles	Number of nests within a 330-foot primary zone	3 nests	2 nests	2 nests	0 nests	1 nest
	Number of nests within a 330- to 660-foot secondary zone	5 nests	4 nests	3 nests	0 nests	0 nests
3.23 Coastal Zone Management						
Coastal Zone Management		No impact				

This Executive Summary is intended to provide an overview of the Sterling Highway 45-60 Project SEIS. For more detail, please refer to the full SEIS document.

We appreciate your participation in this process.


Juneau Cr
Bean Cr
Sterling Highway
MP 54
MP 53

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Appendix D: Highway Traffic Noise Assessment

Appendix E: Preliminary Location Hydraulic Study

Appendix F: Draft Section 4(f) *De Minimis* Findings Forms

Acronyms and Abbreviations

3R	Resurfacing, Restoration, Rehabilitation
4R	Full Reconstruction Alternative
AAC	Alaska Administrative Code
AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ACHP	Advisory Council on Historic Preservation
ACMP	Alaska Coastal Management Program
ACS	American Community Survey
ADCCED	Alaska Department of Commerce, Community, and Economic Development
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADOLWD	Alaska Department of Labor and Workforce Development
ADT	Average Daily Traffic
AHRS	Alaska Heritage Resource Survey
AMSA	Area which Merits Special Attention
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
APDES	Alaska Pollutant Discharge Elimination System
APE	Area of Potential Effect
APMVM	Accidents per Million Vehicles per Mile Traveled
AS	Alaska Statute
ASTM	American Society for Testing and Materials
ATV	All-terrain Vehicle
B&B	Bed-and-breakfast
BCC	Birds of Conservation Concern
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practices
Borough	Kenai Peninsula Borough
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIRI	Cook Inlet Region, Incorporated
CNF	Chugach National Forest
CO	Carbon Monoxide
CPMVM	Crashes per Million Vehicle Miles
CRC	Cultural Resource Consultants, LLC
CWA	Clean Water Act
dB	Decibel
dBA	A-weighted Decibel
DCOM	Alaska Division of Coastal and Ocean Management
DEIS	Draft Environmental Impact Statement

DHHS	U.S. Department of Health and Human Services
DLP	Defense of Life or Property
DMLW	Division of Mining Land and Water
DNR	Alaska Department of Natural Resources
DOI	U.S. Department of the Interior
DOT&PF	Alaska Department of Transportation and Public Facilities
DPOR	Alaska Department of Parks and Outdoor Recreation
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Committee
FHWA	Federal Highway Administration
FMP	Fisheries Management Plan
FONSI	Finding of No Significant Impact
FSB	Federal Subsistence Board
ft^3/s	Cubic Feet per Second
GHG	Greenhouse Gases
GIS	Geographic information systems
HDR	HDR Alaska, Inc.
HMCP	Hazardous Material Control Plan
HSIP	Highway Safety Improvement Program
Hz	Hertz
ICAP	Indirect Cost Allocation Plan
IHS	Interstate Highway System
INHT	Iditarod National Historic Trail
IRA	Inventoried Roadless Areas
ISER	Institute for Social and Economic Research
KMM District	Kenai Mining and Milling Co. Historic District
KNWR	Kenai National Wildlife Refuge
KRSMA	Kenai River Special Management Area
Leq(h)	Average Sound Level Occurring Over a 1-hour Period
LOS	Level of Service
LHS	Location Hydraulic Study
LUST	Leaking Underground Storage Tank
LWCF	Land and Water Conservation Fund
m	Meter
mg/L	Milligrams per Liter
mm	Millimeter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MP	Milepost(s)
mph	Miles per Hour
µS/cm	Microsiemens per Centimeter
NEPA	National Environmental Policy Act

NFA	No Further Action
NFRAP	No Further Remedial Action Planned
NHD	National Hydrologic Database
NHPA	National Historic Preservation Act
NHS	National Highway System
NM	Noise Monitoring
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
O&M	Operations and Maintenance
OHA	State of Alaska Office of History and Archaeology
OHMP	State of Alaska Office of Habitat Management and Permitting
OPMP	Office of Project Management and Permitting
PCM	Alaska Preconstruction Manual
PL	Public Law
PLO	Public Land Order
$PM_{2.5}$	Particulate Material with a Diameter of 2.5 Micrometers
PM_{10}	Particulate Material with a Diameter of 10 Micrometers
RCRA	Resource Conservation Recovery Act
Resurrection Pass Trail	Resurrection Pass National Recreation Trail
RFFA	Reasonably Foreseeable Future Actions
RM	River Mile
ROD	Record of Decision
ROW	Right-of-way
RRLA	Russian River Land Act
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Officer
SRD	Seward Ranger District
sq. ft.	Square Foot/Feet
STRAHNET	Strategic Highway Network
SWPPP	Storm Water Pollution Prevention Plan
TCP	Traditional Cultural Property
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground Storage Tanks
VPP	View Prioritization Process
VQE	Visual Quality Evaluation

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Sterling Highway MP 45–60
Draft SEIS and Draft Section 4(f) Evaluation

Chapter 1
Purpose of and Need for the Project

Prepared for:

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1 Purpose of and Need for the Project

1.1 Introduction

Steep mountains in the Kenai River Valley (Cooper Landing, Alaska)

The Sterling Highway, located in Southcentral Alaska, is part of the Interstate Highway System, National Highway System (NHS), and Strategic Highway Network.[1] Named in honor of Hawley Sterling, an engineer of the Alaska Road Commission, the Sterling Highway was constructed starting in the late 1940s and opened in 1950. While the rest of the highway has seen major upgrades since the 1950s, the highway between Mileposts (MP) 45 and 60 has not been substantially upgraded. This portion of the highway is located in the Kenai River Valley and is constrained by the Kenai River, steep mountainsides, salmon spawning areas, private property, and several trails, campgrounds, and other recreational features that have hindered highway upgrades. The Alaska Department of Transportation and Public Facilities (DOT&PF) and the Federal Highway Administration (FHWA) are proposing to improve this portion of the Sterling Highway. The proposed project is located about 100 highway miles south of Anchorage in the Kenai Peninsula Borough (Borough) (see Map 1.1-1, Project vicinity).

The Supplemental Environmental Impact Statement (SEIS) is a supplement to a previous draft environmental impact statement (EIS; see DOT&PF (1994)). This chapter of the SEIS presents the purpose of and need for the project and describes the problems the project seeks to address. The first section provides an introduction to the project, including an overview of the project area (Section 1.1.1), the project's history (Section 1.1.2), and the project termini (Section 1.1.3). Section 1.2 presents the project purpose and need, and includes details on the following problems that this project would address: (1) undesirable levels of traffic congestion, (2) low percentage of the roadway meeting current design standards, and (3) a higher-than-average number of traffic crashes.

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[1] Interstate Highway System. The Dwight D. Eisenhower National System of Interstate and Defense Highways "shall be located so as–(i) to connect by routes, as direct as practicable, the principal metropolitan areas, cities, and border points with routes of continental importance in Canada and Mexico" (23 USC 103[c]). The Interstate Highway System was designed to provide key ground transport routes for military supplies and troop deployments in case of an emergency or foreign invasion. Interstate highways are a subset of the broader NHS. Both are part of the Federal-Aid Highway Program that provides substantial funding to State transportation agencies (23 USC 103[b]).

NHS. The NHS shall: "(A) serve major population centers, international border crossings, ports, airports, public transportation facilities, and other intermodal transportation facilities and other major travel destinations; (B) meet national defense requirements; and (C) serve interstate and interregional travel" (23 USC 103[b]).

Strategic Highway Network. The Strategic Highway Network is a network of highways that is important to the United States' strategic defense policy and that provides defense access, continuity, and emergency capabilities for defense purposes.

1.1.1 Description of the Project Area

The Sterling Highway is located on the western Kenai Peninsula in Southcentral Alaska. As part of the NHS, the Sterling Highway is the only road connecting western Kenai Peninsula communities (Homer, Kenai, Soldotna, and others) with the rest of Alaska and the rest of the NHS. The NHS supports the statewide economy because it provides efficient overland travel between local cities, major cities, and the ports and airports. The Sterling Highway also serves local, growing traffic in Cooper Landing, including a large influx of summer visitors to the project area.

The project area for this SEIS is shown on Map 1.1-1. The project area includes the western end of Kenai Lake and follows the Kenai River Valley downstream about 11 miles, nearly to the western edge of the Kenai Mountains. North and south, the project area extends up Juneau Creek about 2.5 miles and extends up Cooper Creek about 1 mile from its mouth. The project area elevation at the Kenai River ranges from 440 feet at the Kenai Lake outlet to 250 feet at the western end of the project area. High elevations in the project area are along mountain slopes on either side of the valley at 1,000 to 1,500 feet.

The project area encompasses many popular recreational sites, including fishing areas on the Kenai and Russian rivers, the Resurrection Pass National Recreation Trail, and the Russian River and Cooper Creek campgrounds. The community of Cooper Landing was founded during the 1898 gold rush, but Alaska Natives used the Kenai River Valley for more than 1,500 years prior to the discovery of gold (Corbett 1998). Consequently, archaeologists and historians have identified many prehistoric and historic sites in the project area. In addition, the areas surrounding the highway provide habitat for numerous wildlife species, including moose, bald eagle, Dall sheep, and brown bears. Project area water bodies support a world-class fishery for five salmon species, rainbow trout, and Dolly Varden. The Sterling Highway, from the Seward Highway to the western terminus of Skilak Lake Road (MP 37–75), has been identified by the State of Alaska as a State scenic byway in recognition of its scenery, natural setting, recreational activities, historic significance, and wildlife viewing opportunities (Jensen Yorba Lott, Inc. 2008).

World-class fishing and scenery attract thousands of visitors to the project area.

The project area lies within the Chugach National Forest and the Kenai National Wildlife Refuge (KNWR). Remaining lands are owned by the Borough, the State of Alaska, private citizens, and Cook Inlet Region, Incorporated—the area's regional Native Corporation established by the Alaska Native Claims Settlement Act. Land ownership in the project area is further discussed in Section 3.1.1.

This diverse mountain, forest, and river setting attracts thousands of visitors annually. For example, Alaska Department of Fish and Game statewide harvest surveys estimate that anglers logged approximately 315,000 days of fishing time on the Kenai River each year between 1997

and 2006 (DNR 2010). Similarly, the *Kenai National Wildlife Refuge Final Revised Comprehensive Conservation Plan* estimates that approximately 1.2 million people travel on the Sterling Highway through the KNWR each year, and an estimated 300,000 visitors spend extended periods of time in the KNWR (USFWS 2010a). Cooper Landing, an unincorporated community of 289 people (USCB 2010c), is located along the highway at approximately MP 48. The local economy is based largely on recreation and tourism.

The Sterling Highway MP 45–60 area currently is characterized by sharp curves and narrow shoulders.

Because the portion of Sterling Highway in the project area is bounded by rugged mountains and is situated in the narrow Kenai River Valley, the highway remains narrow and curvy, with steep grades down to Kenai Lake. This portion of the highway lacks shoulders and recommended sight distance to see around corners and over hillcrests. Frequent driveways and side roads connect directly to the highway, creating conflict points as drivers enter and exit the highway. Because of the communities it serves and the popular recreational destinations along the route, the highway is heavily traveled and congested, particularly in summer. The types of vehicles traveling the highway include motor homes, trucks hauling freight, and vehicles towing boats, all of which contribute to slow travel and difficult passing. Additionally, many of the travelers in summer are visitors who are unfamiliar with the area.

1.1.2 Project History

DOT&PF has been planning and studying improvements in the corridor since the early 1980s. A Draft EIS and Section 4(f) Evaluation that assessed reconstruction of the Sterling Highway from the Seward Highway junction (MP 37) to the Skilak Lake Road intersection (MP 58), referred to as the Sterling Highway MP 37–60 Project, was approved by FHWA on June 29, 1982. At that time, the Draft EIS assessed reconstruction of the existing highway with three major realignments that would have extended from MP 42.4 to 43.5, MP 49 to 49.5, and MP 50 to 52. Each of the alternatives in the 1982 Draft EIS, including the preferred alternative, included new bridge crossings of the Kenai River. Because of agency opposition to these crossings and changes in the affected environment that occurred after the Draft EIS was issued, the project was not implemented and was put on hold. Changes to the affected environment included the discovery of important prehistoric sites within the construction limits of the preferred alternative and the creation of the Kenai River Special Management Area, a unit of the Alaska State Park system.

In 1994, DOT&PF and FHWA issued a second Draft EIS and Section 4(f) Evaluation for the Sterling Highway MP 37–60 Project that addressed the No Build Alternative; a new alternative that remained north of the Kenai River and crossed Juneau Creek; and a Resurfacing, Restoration, Rehabilitation (3R) Alternative that followed the existing alignment. After the 1994

Draft EIS was issued, DOT&PF and FHWA decided to split the Sterling Highway MP 37–60 Project into two separate projects. The portion of the project from MP 45 to MP 60 examined in the 1994 Draft SEIS, with multiple reasonable build alternatives, had more complex environmental and social issues than the portion of the project from MP 37 to 45, which had only one reasonable build alternative. In addition, each portion had logical endpoints and had independent utility, meaning that each would be a valuable improvement regardless of whether the other was constructed. The construction of the Sterling Highway project between MP 37 and 45, covered under a separate environmental document, was completed in 2001.

This current project evaluates the Sterling Highway between MP 45 and 60. FHWA and DOT&PF began this SEIS in 2000 to supplement the 1994 Draft EIS. FHWA issued its Notice of Intent to prepare a draft SEIS in the *Federal Register* in May 2003.

1.1.3 Project Termini

The project's logical termini (i.e., starting and stopping points for construction) are the intersection of the existing Sterling Highway with Quartz Creek Road on the east and the intersection with Skilak Lake Road on the west. In reality, the limits of any potential construction activities would be MP 44.5 to 58.2. However, MP 45 and MP 60 have been used historically to define the project, and have therefore continued to be used as the project's formal name. The issues related to the existing Sterling Highway from MP 45 to 60 are connected to the physical setting of the highway within steep, rugged mountains and the narrow Kenai River valley, the community of Cooper Landing, and a string of popular recreation destinations operated as part of contiguous State Park, National Forest, and National Wildlife Refuge lands. This setting, combined with the period when the highway was constructed (i.e., 1940s to 1950), has resulted in large sections of the road having curves, lane widths, shoulder widths, and other basic safety and function parameters that do not meet current standards. These issues are unique to the project area and support the Quartz Creek Road and Skilak Lake Road intersections with the Sterling Highway as logical end points for the project.

When comparing the adjacent portions of the Sterling Highway to the east and west of the project area (i.e., approximately east of MP 45 and west of MP 58, respectively), the difference in highway character supports the project's end points and its utility. To the east, the existing highway was constructed to current standards in 2001 (see Section 1.1.2) and therefore has lane and shoulder widths and curves that have been upgraded. To the west, the existing highway has shoulders and is characterized by long straight stretches of roadway where the highway leaves mountainous terrain for flat lands. Therefore, tight curves do not exist and its lane and shoulder widths are compatible with the physical setting of the roadway. The improvements proposed for the Sterling Highway from MP 45 to 60 would facilitate meeting driver expectation and improve overall highway function and safety, because recommended design elements would be applied consistently throughout the project area, and because the resulting highway would be consistent with previous improvements that have been made to the east and west.

1.2 Purpose of and Need for Action

1.2.1 Project Purpose

DOT&PF and FHWA propose to improve the Sterling Highway from its intersection with Quartz Creek Road to its intersection with Skilak Lake Road. The highway is classified as a rural principal arterial (see box at right). The purpose of the project is to bring the highway up to current standards for a rural principal arterial to efficiently and safely serve through-traffic, local community traffic, and traffic bound for recreation destinations in the area, both now and in the future. In achieving this transportation purpose, DOT&PF and FHWA recognize the importance of protecting the Kenai River corridor.

Rural principal arterial is the Federal Highway Administration's highest roadway functional classification for a rural area. The rural principal arterial system consists of a connected rural network of continuous routes having the following characteristics:

- "Serve corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel."
- "Connect all or nearly all Urbanized Areas (a U.S. Census designated urban area with 50,000 residents or more) and a large majority of Urban Clusters (a U.S. Census designated area with at least 2,500 residents and no more that 49,999 residents) with 25,000 and over population."
- "Provide an integrated network of continuous routes without stub connections (dead ends)." Exceptions occur where unusual geographic or traffic flow conditions dictate otherwise.

- *FHWA Functional Classification Guidelines*, 2013.

1.2.2 Project Needs

There are three interrelated needs that the project would address:

- **Need 1: Reduce Highway Congestion.** The construction of multiple driveways and connecting side streets over time, combined with a curvy, constrained alignment with little passing opportunity and increasing traffic volumes, has led to considerable congestion that is forecast to worsen in future years. As a result, the highway performs below a desirable level of service for a rural principal arterial that is a component of the NHS.
- **Need 2: Meet Current Highway Design Standards.** Existing characteristics of the Sterling Highway do not meet current design standards for a rural principal arterial road. The existing highway contains curves, shoulders, guardrail, and clear zones[2] that do not meet current design standards.
- **Need 3: Improve Highway Safety.** Due to the interrelated effects of highway congestion and outdated highway design characteristics, the project area has a higher-than-average number of traffic crashes and a greater severity of crashes when compared to the statewide average.

1.2.2.1 Highway Traffic and Congestion

Traffic Volume Trends

When the Sterling Highway was constructed as a pioneer road to Kenai in the late 1940s and paved in the 1950s, it served a much smaller population, and relatively little tourism existed. The

[2] Clear zone: A clear zone is an unobstructed, relatively flat area that runs the length of a highway beyond the outer edges of the outer lanes. Such an area allows a driver to stop safely or regain control of a vehicle that leaves the traveled way (FHWA 2006a).

existing road was suitable in the 1950s for the vehicle types and corresponding travel speed of that time. The entire Borough had a population of 4,831 in 1950 and 9,053 in 1960 (KPB 2005a). As of the 2010 Census, the Borough had grown to 55,400 residents.

Traffic continues to increase in the project area as a result of both the increasing population base and an increase in summer tourism, but the highway's capacity to accommodate traffic remains at the 1950s level. Historic annual traffic counts indicate that traffic growth has been increasing steadily, as shown in Table 1.2-1. The highway sections described in Table 1.2-1 are based on locations of DOT&PF traffic recording devices. Map 1.2-1 shows the locations of these sections.

Table 1.2-1. Historic traffic volume growth

Section	Historic Annual Average Daily Traffic Volumes			Percentage of Change	Annual Growth Rate
	1991	2001	2012	1991–2012	1991–2012
Quartz Creek Road to Snug Harbor Road	3,006	3,320	3,270	0.9%	0.04%
Snug Harbor Road to Russian River Campground	2,900	3,194	3,270	12.76%	0.6%
Russian River Campground to Russian River Ferry Entrance	2,900	2,870	3,456	19.17%	0.88%
Russian River Ferry Entrance to Skilak Lake Road	2,500	3,200	3,140	25.6%	1.15%

Source: DOT&PF *Annual Traffic Volume Report*, 2012

When measured in 2011, DOT&PF determined that nearly 54 percent of all annual traffic occurred during the months of June, July, and August, with approximately 23 percent of the annual traffic occurring in July alone (Lounsbury 2014). In 2011, the *summer* average daily traffic was 8,198 vehicles per day while the *annual* average daily traffic was 3,410 vehicles per day.[3]

Traffic trends for the last 20 years were used to forecast future traffic volumes for the 2043 design year. Growth over the next 20 years was assumed to be similar to the last 20 years. In general, growth in the project area was approximately 0.67 percent. Distinct destinations and locations related to recreation include many back-and-forth trips that account for higher growth rates in some roadway segments. These travel patterns are expected to continue. Considering overall growth and growth related to destinations, a compound annual growth rate of 1.0 percent was applied to determine future traffic volumes.

Table 1.2-2 compares the actual traffic volumes for 2012 with projected traffic volumes for the design year, 2043. These volumes are used in the traffic analyses for this project, both for annual (12-month) average daily traffic (ADT) and for summer (the peak traffic period).

[3] 2011 traffic volumes are from actual counts.

Table 1.2-2. Future traffic volume growth

Segment	Annual Average Daily Traffic Volumes		Summer Average Daily Traffic Volumes	
	2012[a]	2043[b]	2012[a]	2043[b]
Quartz Creek Road to Snug Harbor Road	3,033	5,604	4,953	9,152
Snug Harbor Road to Russian River Campground	3,270	6,042	5,340	9,867
Russian River Campground to Russian River Ferry Entrance	3,456	6,386	5,644	10,428
Russian River Ferry Entrance to Skilak Road	3,140	5,802	5,128	9,475

[a] 2012 traffic volumes come from actual counts.

[b] 2043 volumes were forecast using a 1 percent annual growth rate based on the 20-year linear trend line growth.

Source: Lounsbury *(2014)*

Traffic Congestion

Traffic engineers measure highway function using level of service (LOS). Traffic congestion affects the LOS. LOS categories range from LOS 'A' (best) to LOS 'F' (worst), as shown in Figure 1.2-1. For a highway such as the Sterling Highway, LOS is determined in two ways: travel speed and percentage of time spent following other vehicles. Speeds below the highway design speed increase travel time and decrease the efficiency of the trip. Comparison of actual speed with design speed is an accepted measure of the LOS a highway provides. The percentage of time spent following other vehicles considers the time drivers spend in queues (lines) behind other drivers. Increased time spent following other vehicles indicates congestion on the highway and negatively affects driver attention and patience, and travel efficiency. For these reasons, percentage of time spent following other vehicles is used to determine LOS.

Congestion occurs when a platoon of cars forms and when drivers are unable to travel at steady, reliable speeds commensurate with the functional classification of the road—in this case, a rural principal arterial that is part of the National Highway System. Congestion occurs where trucks or RVs are climbing a hill and must gear down to carry the heavy vehicle up the grade, or where curves are sharp and vehicles must slow down to safely maneuver, or where there is little room between oncoming traffic and the ditch and drivers are feeling stress (white knuckle conditions), or where side streets or driveways cause drivers to slow or stop to wait for opposing traffic before making their turns. Each of these examples can cause a platoon to form and cause drivers to spend a percentage of their time following another vehicle. Even when there are passing opportunities, a driver may move freely for a time only to be caught up in another platoon, increasing the time spent following others.

Few passing opportunities exist in the project area.

Because of the curvy alignment, narrow roadway, and poor visibility to see around curves, there are very few passing opportunities available in the project area. The growing population of Southcentral Alaska and of Kenai Peninsula communities served by the Sterling Highway, along with the increasing traffic and the limited passing opportunities, result in more time spent following other drivers, higher congestion, lower travel speeds, and consequently a lower LOS.

Level of Service

LOS A describes the highest quality of traffic service. Motorists travel at their desired speed. Without strict enforcement, LOS A results in average speeds of 55 mph or more. Passing demand is below passing capacity. Platoons of three or more vehicles are rare. Drivers are delayed no more than 35% of their travel time by other vehicles.

LOS: A or B

LOS B characterizes traffic flow with speeds of 50 mph or slightly higher on level terrain. The demand for passing to maintain desired speeds becomes significant. Drivers are delayed in platoons up to 50% of the time.

LOS C describes noticeable increases in platoon formation, platoon size, and frequency of passing impediments. The average speed still exceeds 45 mph. Chaining of platoons can occur. Although traffic flow is stable, it is susceptible to congestion due to turning traffic and slow-moving vehicles. Percent time spent following may reach 65%.

LOS D describes unstable traffic flow. Passing demand is high, with passing capacity near zero. Platoon sizes of 5-10 vehicles are common, although speeds of 40 mph still can be maintained. Turning vehicles and roadside distractions cause major shock waves in the traffic stream. Motorists are delayed in platoons nearly 80% of their travel time.

Photo illustration
LOS: D or E

LOS E describes a condition where percent time spent following is greater than 80%. Speeds may drop below 40 mph, down to 25 mph on sustained grades. Passing is virtually impossible. Platooning becomes intense. Operating conditions are at capacity and unstable.

LOS F represents heavily congested flow with traffic demand exceeding capacity. Volumes are lower than capacity, and speeds are highly variable.

Condensed from *Highway Capacity Manual 2000*

(Transportation Research Board 2000)

Figure 1.2-1. Level of service on two-lane highways

The highway's many curves require speed limit advisory signs for speeds of 45, 35, and 30 miles per hour (mph). There are many intersecting side roads and driveways, including those for campgrounds, informal highway pullouts, boat launch ramps, interpretive sites, businesses, recreational properties, and homes. These intersections cause highway traffic to slow or stop to wait for vehicles to enter or leave the highway. The need for mobility (i.e., serving through-traffic) and the need for access (i.e., driveways and approach roads that connect local destinations to the larger road and serve local traffic) are considerations when making roadway design decisions. The ideal condition for mobility on a highway is to fully control access, as seen on freeways, with the only access provided via on-ramps and off-ramps so that through-traffic need not slow substantially for local traffic entering or leaving the highway. The ideal condition for access to smaller roads, businesses, and homes is the most direct connection possible from the highway to any given local destination. In the project area, mobility is hampered by the provision of access via driveways, which results in slow-moving vehicles at intersections. Meanwhile, local access is hampered at busy times by a steady stream of through-traffic that makes it difficult to get on the highway.

As mentioned in Section 1.1.1, the project area is a popular destination for summer recreationists, and their traffic, combined with recreational through-traffic bound for the lower Kenai River and western Kenai Peninsula, results in peak traffic volumes that are high during June, July, and August (see Section 4.2 for details on recreation resources that generate traffic). These high volumes overload the capacity of the highway, causing traffic to slow. Travel speeds are slowest during peak use when the roadway becomes congested.

Traffic congestion is exacerbated on this section of the Sterling Highway by the presence of many large recreational vehicles (motor homes); recreational vehicles pulling boat trailers, all-terrain-vehicle trailers, or camp trailers; tractor-trailer trucks; and tourist buses. Such recreational traffic and local traffic merging on and off the highway from multiple access points, including pullouts, result in slow traffic speeds and a large number of conflict points, which result in congestion. While the project area has a reputation for such congestion during the summer peak traffic period, such delays can happen at any time of year. If a line of vehicles forms in the winter, or a car stops on the highway to make a turn causing other cars to back up, this is a symptom of congestion. Even at lower volume times, congestion causes unsafe passing attempts or crashes when one vehicle hits stopped cars or goes off the road to avoid them. Winter road conditions may also cause some drivers (e.g., those without studded tires, or towing a trailer) to drive more slowly than others and also may lead to congestion.

Based on the resultant travel speeds and percentage of time spent following other vehicles on this portion of the existing Sterling Highway, the 2012 LOS and projected 2043 LOS were determined and compared to national standards put forth by the Transportation Research Board in the *Highway Capacity Manual* (2000). The LOS is not identified for the worst-case condition, but rather for the condition that represents an above average, but less than the worst-case, condition (refered to as the 100th-highest traffic volume hour throughout the course of the year[4]). For this project, this condition occurs during the summer.

[4] The 100th-highest hour means that there would be 99 hours over the course of the year where traffic is higher than that used to determine the LOS, but the rest of the time traffic volumes would be equal to or less than that amount. For this project, the 100th-highest hour occurs during the summer.

Due to the length, varying conditions, and other physical features (such as points of interests, businesses, and trail heads), the LOS for the project area was evaluated in segments based on highway mileposts and reported using the LOS letter grades. The following segments were used to evaluate LOS:

- Segment 1 – MP 44.5 to MP 46.6
- Segment 2 – MP 46.6 to MP 47.8
- Segment 3 – MP 47.8 to MP 49.4
- Segment 4 – MP 49.4 to MP 51.3
- Segment 5 – MP 51.3 to MP 55.1
- Segment 6 – MP 55.1 to MP 58.2

Figure 1.2-2 illustrates the hourly traffic volumes for both 2012 and the 2043 design year for year-round and summer-only conditions. The related LOS for each segment is shown in Table 1.2-3 and Map 1.2-2.

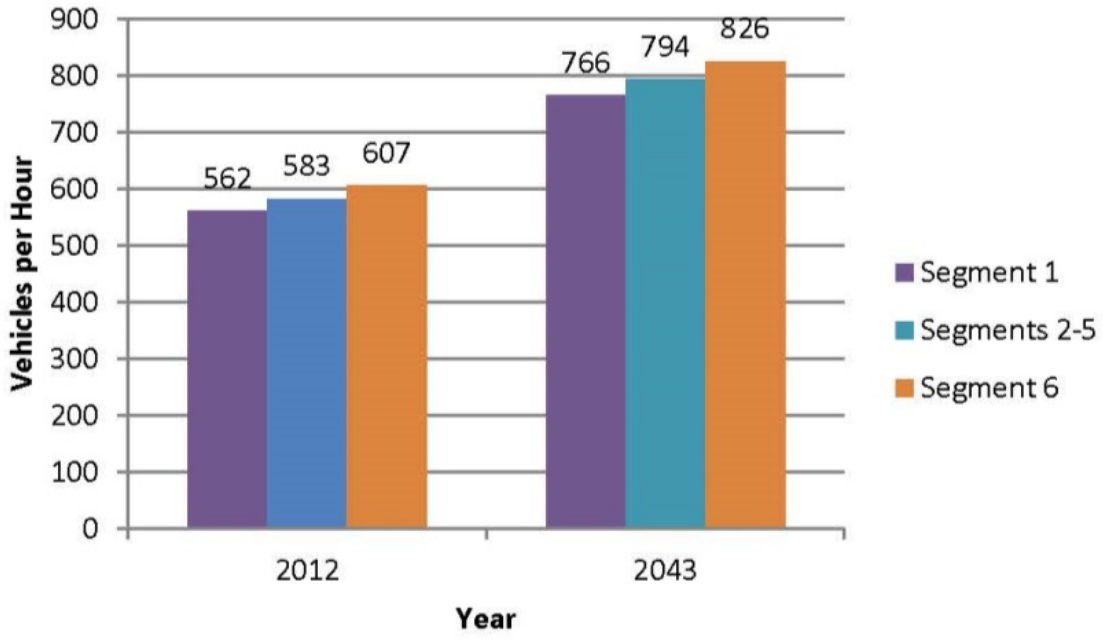

Figure 1.2-2. 2012 and 2043 summer condition vehicles per hour

Table 1.2-3. Existing and forecasted level of service

Project Area Segment	Direction	% Total Length[a]	2012 Existing LOS	2043 Forecast LOS
1	EB	8.0	D	D
	WB	8.0	D	D
2	EB	4.0	D	D
	WB	4.0	D	D
3	EB	6.0	D	D
	WB	6.0	D	D
4	EB	8.0	D	D
	WB	8.0	D	D
5	EB	12.0	D	D
	WB	12.0	D	D
6	EB	12.0	C	D
	WB	12.0	C	D

Note: EB = eastbound; WB = westbound.

[a] The project area is about 15 miles long. "Total Length" includes both directions of travel and therefore is approximately 30 miles.

Source: Lounsbury *(2014)*. Note that in the Lounsbury report, Tables 21A and 21B, the segments are numbered in the opposite order from those in this SEIS.

As shown in Table 1.2-3 and Map 1.2-2, traffic conditions in summer[5] for both existing and the forecasted conditions are mostly at LOS D with only Segment 6 having a LOS C in the existing condition. When 2043 trips are considered during the summer peak recreation season (i.e., weekends, holidays, and during peak salmon runs), travel speed will be slower, and the percentage of time spent following other vehicles is expected to increase. All segments of the Sterling Highway in the project area are projected to worsen in average speed and percentage of time spent following other vehicles, and to be at a LOS D in the design year 2043.

DOT&PF typically strives to achieve at least LOS C on its facilities, but will in some cases accept a lower LOS if the costs or impacts are too great to achieve a higher LOS.[6] For the project area, DOT&PF has determined that, with high traffic volumes in summer and relatively low volumes the rest of the year, it is not economical to develop the highway for optimum LOS year-round. To do so would likely require building a four-lane highway throughout the project area that would be used effectively only 3 months of the year and would provide excess capacity the

[5] Level of service for this study is based on the estimated 100th highest hour of traffic.

[6] The American Association of State Highway and Transportation Officials (AASHTO) standard (AASHTO 2004) indicates that rural arterials generally should be designed for LOS B, except in mountainous terrain, where LOS C is considered appropriate. However, AASHTO provides for flexibility depending on specific conditions, indicating that "as may be fitting to the condition," highway agencies should "strive to provide the highest level of service *practical*" (emphasis added), and "choice of appropriate level of service for design is properly left to the highway designer."

rest of the year. In addition to higher costs, such a highway would cause unnecessary environmental impacts and would not match the adjoining sections of the Sterling and Seward highways, which are two-lane highways with passing lanes.

Roadway improvements as a result of implementation of this project are intended to increase travel speeds and reduce time spent following other drivers, thus reducing congestion in the project area.

1.2.2.2 Highway Design Standards

The American Association of State Highway and Transportation Officials (AASHTO) publishes *A Policy on Geometric Design on Streets and Highways* (2004, updated periodically). This publication presents detailed treatment of all elements of road design and is the national source for road design standards. AASHTO provides standards which are often expressed as a range of values. Within this range, AASHTO leaves final selection of the roadway's actual design criteria to engineers based on local conditions and needs. Individual state transportation departments typically adopt the AASHTO standards, with some modifications based on specific conditions in that state. DOT&PF publishes the *Alaska Highway Preconstruction Manual* (2010b, updated periodically). For NHS roadways in Alaska, the *Alaska Highway Preconstruction Manual* typically conforms "to the recommendations of AASHTO."

Within the project area, the Sterling Highway does not meet current standards for a rural principal arterial. This contributes to the congestion and relatively poor LOS, as described in Section 1.2.2.1. Table 1.2-4 summarizes key design standards determined by DOT&PF for the project. Each of these standards is discussed in turn following the table.

Table 1.2-4. Existing Sterling Highway MP 45–60 and rural principal arterial design standards

	Design Standard[a]	Distance[b] Not Meeting Standard	Percent Not Meeting Standard
Design Speed (mph)	60	15 miles at 55 mph or less 4 miles at 40 mph or less	100%
Minimum Curve Radius (feet)	1,330	21 of 43 curves less than standard radius	49%
Lane Width (feet)	12	13.7 of 15 miles less than 12-foot-wide lanes	91%
Shoulder Width (feet)	6–10	15 of 15 miles less than 6-foot-wide shoulders	100%
Clear Zone (feet)	30–32	14 of 15 miles less than 30-foot-wide clear zone	95%

[a] The design standards are guidelines spelled out in AASHTO *(2004)* and adopted by DOT&PF and FHWA and, in this case, are specific to "rural principal arterial" highways. The design standards frequently represent a range of values, allowing designers latitude based on local conditions. DOT&PF has identified 60 mph as the appropriate design speed for the project corridor.

[b] The mileposts used for this table are MP 45-60.

The Sterling Highway's existing design can be attributed to the road being constructed to fit the existing topography. The existing alignment does not account for new safety standards, larger vehicles, or more traffic. The highway was constructed at a time when automobiles were slower,

truck sizes generally were smaller, and recreational vehicles and tourist buses were much fewer and smaller.

Design Speed

AASHTO recommends a design speed for a roadway in level terrain in the range of 60 to 75 mph, in rolling terrain of 50 to 60 mph, and in mountainous terrain of 40 to 50 mph. The "design speed" means the speed at which the highway should be physically traversable, with adequate ability for a driver to see the road ahead, negotiate curves, and drive comfortably. The terrain within the project area varies between level and mountainous. However, since the highway traverses along the river valley and sides of the mountains, the corridor characteristics are more typical of rolling terrain rather than mountainous. Highway design engineers have identified that 60 mph is an achievable and desirable design speed to match the driver expectations and conditions of the adjacent highway segments. The steepest grades would not exceed 6 percent, which allows for the higher design recommendation.

The design speed often differs from—and should not be confused with—the posted speed limit. Posted speed limits, as a matter of policy, are not the highest speeds that might be used by drivers. Instead, such limits are usually set to approximate the 85th percentile speed of traffic (AASHTO 2004). The 85th percentile speed is the speed at or below which 85 percent of drivers are operating their vehicles and is usually within a 10 MPH speed range used by most drivers. The posting of a speed based on the 85th percentile promotes uniformity of speed, and vehicle collisions are less likely to occur when vehicles are traveling at about the same speed. The design speed often exceeds the posted speed limit.

Curves

The minimum curve radius that allows for a 60 mph design speed is 1,330 feet (i.e., all points on the highway centerline through the curve would be 1,330 feet from the imaginary center point of a circle). There are 43 curves on the existing alignment in the project area, and 21 of them (49 percent) do not meet this standard, as shown in Map 1.2-4.

Sharp curves and narrow shoulders slow traffic and reduce visibility around corners

Approximately 3 miles of the existing highway in the project area have speed limits posted at 35 mph or less, because the curves do not meet the design criteria for curve radius. Curves tight enough to warrant a 35 mph posting may contribute to single-vehicle run-off-the-road crashes and truck rollovers (see Section 1.2.2.3 for information on crashes in the project area). This may be due to limited sight distances around the curve, and the existing roadway characteristic of narrow lanes and limited shoulders and clear zones. An additional 6.5 miles of the existing highway in the project area have posted speed limits of 45 mph. Statewide these sections of the Sterling Highway are among the longest sections of NHS rural principal arterials with such low posted speeds.

One particular area provides a primary example of the complexity of the existing highway's problems with curves: the area between MP 49 and MP 50.5, at the western edge of the Cooper

Landing community. Within this 1.5-mile stretch of the highway are seven curves, two of them broad curves that easily meet the standard but five of them well below the standard minimum curve radius. The five substandard curve radii are 441 feet (38 mph), 478 feet (40 mph), 498 feet (42 mph), 716 feet (47 mph), and 955 feet (53 mph). The curves exist in this area because the highway directly follows the toe of the steep mountain slope where it meets the Kenai River floodplain.

In general, the curvy existing road impedes the ability of drivers to see upcoming hazards and reduces the time available to stop or slow down when hazards become visible. Similarly, the visibility required to pass safely and efficiently is hindered. Although 90 percent of the highway in the project area is designated "no passing," frustrated motorists pass in areas where passing is prohibited. These conditions contribute to safety concerns within the project area.

Low speeds are currently posted for tight curves and poor visibility

Lanes and Shoulders

AASHTO (2004) standards for rural principal arterials call for 12-foot-wide lanes with 6- to 10-foot-wide shoulders. The DOT&PF has adopted this standard for the project area. The existing highway has lane widths of about 11 feet, with variable shoulder widths down to as little as 0.5 foot and typically not more than 2 feet. As indicated in Table 1.2-4 and shown on Map 1.2-4, 13.7 miles of the 15 miles (91 percent) of existing highway (MP 45–60) has lane widths less than 12 feet. All 15 miles have shoulders less than 6 feet.

Narrow lanes and narrow or non-existent shoulders constrain drivers maneuverability when encountering oncoming vehicles, pedestrians, stalled vehicles, guardrails or ditches, and other obstacles on the side of the road. This in turn leads to reduced driver comfort and corresponding slower driving speeds or, in some cases, may contribute to crashes when drivers do not slow down or are impatient to pass others who have slowed (see Section 1.2.2.3 for information on crashes in the project area). Driving difficulties associated with inadequate lane and shoulder widths include limited maneuvering space, lack of emergency pull-off areas, and limited space for pedestrians who congregate at or travel between recreational sites located near the highway. Insufficient shoulders also contribute to run-off-the-road crashes, which are the majority of severe injury crashes in the project area.

Narrow or nonexistent shoulders increase the chance for run-off-the-road crashes.

Clear Zones

A clear zone is the area alongside the road from the outer edge of the outer lane that is clear of obstructions such as trees, rock outcroppings, and so on, and where side slopes are moderate. In the project area, the existing clear zones are minimal. The clear zone is intended to allow drivers who might leave the designated lane space to recover control of the vehicle or to bring the vehicle to a rest with minimal damage. For drivers who remain within the roadway, the clear zone also provides for visibility and opportunity to see wildlife or people who may be moving toward the road and gives drivers time to safely slow down or stop if they perceive a hazard.

The applicable AASHTO (2004) design standard for a rural principal arterial for the clear zone is 30 to 32 feet. The DOT&PF has determined that the design criterion for the clear zone along the Sterling Highway in the project area is 30 feet. A total of 14 miles of the 15 miles of existing highway (MP 45-60) has less than a 30-foot-wide clear zone, as shown in Table 1.2-4 and Map 1.2-3.

1.2.2.3 Highway Safety

Roadway safety is of primary importance to all agencies responsible for the construction and maintenance of the nation's highways. One way to understand how safe a roadway is for drivers is to review historic crash data. This is done by calculating crash rates for a particular roadway and comparing them to similar facilities within the state. A crash rate takes into account the total number of crashes as well as the volume of traffic and length of roadway involved. This allows crashes on both high- and low-volume primary highways to be compared equally.

A crash analysis (Appendix A of this SEIS) for the project area was performed by evaluating historical crash data (2000–2009) for the Sterling Highway from MP 45 to 60, and comparing the project area crash evaluation to crash data for the entire Sterling Highway as well as to the state as a whole.

The following summarizes the results of the crash analysis.

Project Area Crash Rate

Between MP 45–60, 303 crashes occurred between January 1, 2000 and December 31, 2009. This is a crash rate of 1.72.[7]

Crash occurrences on a roadway can vary greatly depending on the season. Considering the crash rate for both the winter and summer seasons helps in understanding the issues that contribute to crashes.

To determine the seasonal crash rate, winter was considered to be the 5-month period from November to March, while summer was considered to be the 7-month period from April to October. The seasonal crash rate from January 1, 2000 to December 31, 2009, is shown in Table 1.2-5. Although there was less traffic in the winter, there were more crashes during the winter, when snow and ice were likely present and darkness more prevalent.

[7] The crash rate of a roadway segment is determined by calculating how many crashes per million vehicle miles (CPMVM) can be expected within the corridor. To calculate the CPMVM, the total number of crashes within the study period is multiplied by 1,000,000 vehicle miles and divided by the product of the number of days during the study period, the average daily traffic, and the length of the area studied.

Table 1.2-5. 2000–2009 Project area seasonal crash rate

Season	Average Daily Traffic	Total Crashes	Crash Rate (CPMVM)
Winter (Nov.–Mar.)	1,635	153	4.13
Summer (Apr.–Oct.)	4,353	150	1.07

CPMVM = crash rate per million vehicle miles

Project Area Crash Severity

The severity of crashes is also a consideration when evaluating the safety of a roadway. The total number of crashes can indicate functional problems with a roadway, but crash severity indicates the magnitude of the crashes as it relates to the health of the passengers involved in the crash. Table 1.2-6 shows the number of vehicle crashes and the number of resulting personal injuries by crash severity type experienced across the project area between 2000 and 2009. Note that there are six instances where more than one injury type occurred with a single crash. Therefore, that crash counted for each personal injury type that occurred.

Table 1.2-6. Project area crash and personal injury summary from January 2000 to December 2009

Crash Severity Type	# of Occurrence Of Each Vehicle Crash Severity Type[a]	# of Resulting Personal Injuries
Fatal	4	4
Major Injury[b]	18	19
Minor Injury[c]	89	129
Property Damage Only	191	N/A
Total	**302**	**152**

[a] Vehicle crashes reported here are from MP 44.5 to MP 58.2. There are six instances where more than one injury type occurred with a single crash. Therefore, that crash is represented for each personal injury type that occurred.

[b] Major injury crashes are crashes that resulted in incapacitating injuries.

[c] Minor injury crashes are crashes that resulted in non-incapacitating injuries or possible injuries.

N/A = not applicable.

Comparison to Statewide Averages

Table 1.2-7 shows the total number of crashes and the crash rate for each of the segments presented in Section 1.2.2.1. The comparison of these segments to the statewide average indicates that two of the six segments are above the statewide average.

Table 1.2-7. Crash rate by segment (2000–2009)

	Crashes						
	Fatal	Injury	Property Damage Only	Total	Crash Rate[a]	Statewide Average Rate[b]	Percent above/below the Statewide Average
Segment 1 (MP 44.5 - 46.59)	0	16	18	34	1.53	1.80	-17.6%
Segment 2 (MP 46.6 - 47.79)	1	4	19	24	1.38	1.80	-30.4%
Segment 3 (MP 47.8 - 49.39)	1	11	11	23	1.31	1.80	-37.4%
Segment 4 (MP 49.40 - 51.29)	1	9	18	28	1.25	1.80	-44.0%
Segment 5 (MP 51.3 - 55.09)	1	34	75	110	2.46	1.80	+26.8%
Segment 6 (MP 55.1 – 58.2)	0	27	50	77	2.38	1.80	+24.7%
Total	**4**	**101**	**191**	**296**			

[a] The crash rate is the number of crashes per million vehicle miles.

[b] The statewide average rate is for rural primary highways.

Source*: 2009 Alaska Traffic Crashes*, June 2012, Alaska Department of Transportation and Public Facilities
http://www.dot.alaska.gov/stwdplng/transdata/pub/accidents/2009_AK_CrashData.pdf
From Figure 50, the "rural other principal arterial" statewide crash rate is 1.80.

In addition, the crashes within the project area were slightly more severe, on average, as shown in Figure 1.2-3 and Table 1.2-8. Between 2000 and 2009, with the exception of year 2006, the project area (MP 45 to 60) had a higher percentage of major injury (i.e., incapacitating injury) and fatality crashes when compared to the statewide average. Additionally, the project area had consistently fewer property-damage-only and minor-injury (i.e., non-incapacitating injury/possible injury) crashes when compared to the statewide percentage. Fatal injury crashes in the project area were higher than the statewide average for years 2002, 2003, 2004, and 2007.

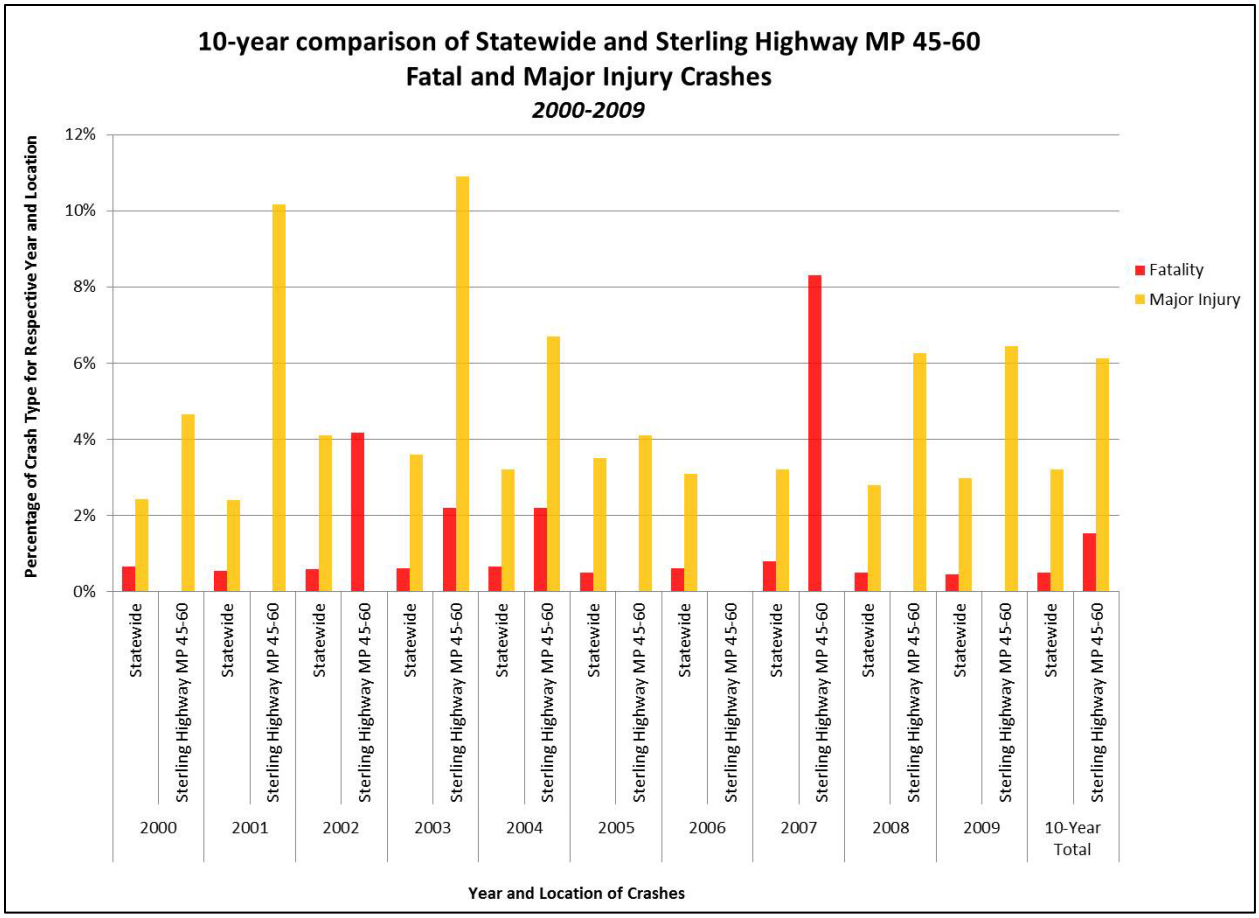

Figure 1.2-3. Comparison of the proportional severity of crashes statewide and within the project area

Table 1.2-8 shows that Segments 2, 3, and 4 exceeded the statewide average for fatal crashes. Segment 5 is just below the statewide average.

Table 1.2-8. Crash severity rate by segment (2000-2009)

	Fatal Crashes	Crash Rate[a]	Statewide Average Rate[b]	Percent above/below the Statewide Average
Segment 1 (MP 44.5 - 46.59)	0	0.000	0.023	N.A.
Segment 2 (MP 46.6 - 47.79)	1	0.058	0.023	+60.3%
Segment 3 (MP 47.8 - 49.39)	1	0.057	0.023	+59.6%
Segment 4 (MP 49.40 - 51.29)	1	0.044	0.023	+47.7%
Segment 5 (MP 51.3 - 55.09)	1	0.022	0.023	-4.5%
Segment 6 (MP 55.1 – 58.2)	0	0.000	0.023	N.A.
Total	4			

[a] The crash rate is the number of crashes per million vehicle miles.

[b] The statewide average rate is for rural primary highways.

Source: *2009 Alaska Traffic Crashes*, June 2012, Alaska Department of Transportation and Public Facilities

http://www.dot.alaska.gov/stwdplng/transdata/pub/accidents/2009_AK_CrashData.pdf

From Figure 50, the "rural other principal arterial" statewide crash rate is 1.80.

Conditions Contributing to Crashes

Between 2000 and 2009, a variety of crash types occurred in the project area, including run-off-the-road and fixed-object (e.g., ditches, culverts, and embankments) crashes; head-on, rear-end, and angle collisions; and moose-related crashes. Figure 1.2-4 illustrates the percentages of crash types within the project area during the analysis period.

While some crashes in the project area are the results of driver error, existing highway design can contribute to crashes as well. Sharp curves, narrow lane and shoulder widths, lack of clear zones, and a proliferation of access points can all contribute to crashes. The following summarizes these conditions as it relates to potential contributors to crashes.

Curves. As discussed in Section 1.2.2.2, curves that do not meet current design standards impede the ability of drivers to see upcoming hazards and reduce the time available to stop or slow down when hazards become visible. Similarly, the visibility required to pass safely and efficiently is hindered. Although 90 percent of the highway in the project area is designated "no passing," frustrated motorists may pass in areas where passing is prohibited.

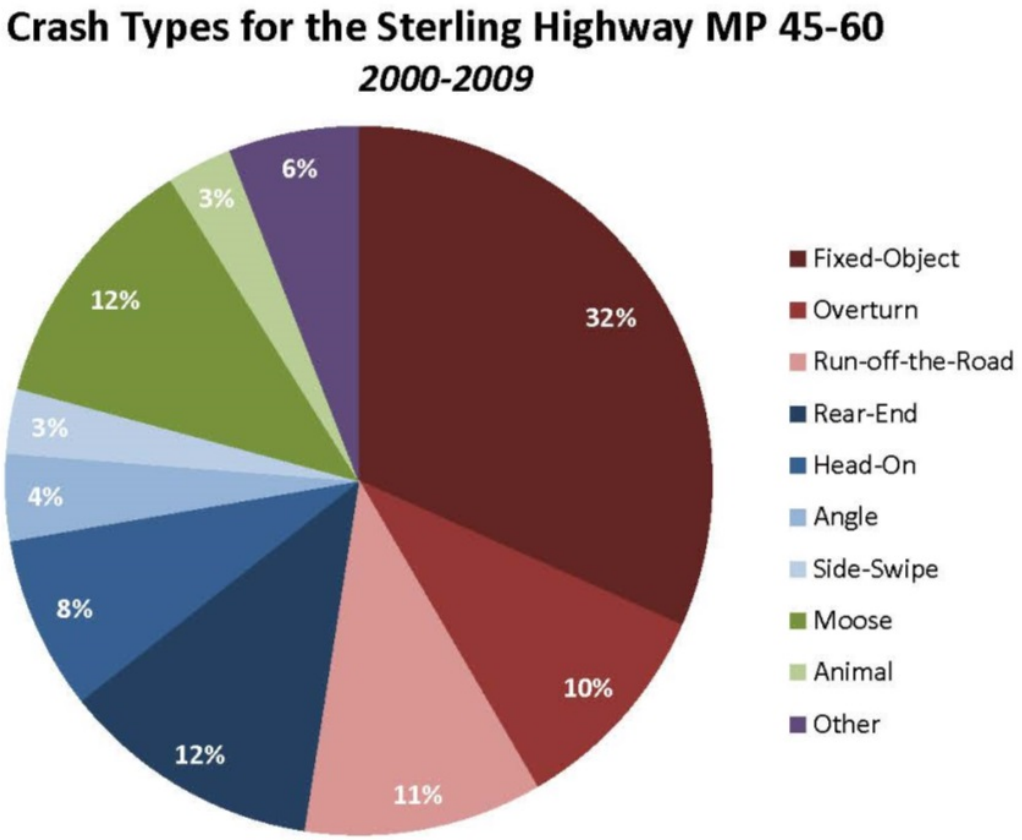

Figure 1.2-4. Crash type within the project area between 2000 and 2009

Lanes and Shoulders. In the project area, narrow shoulders with sharp drop-offs at the shoulder edge can cause a vehicle to roll when a driver is taking corrective action or could even pull a vehicle into the ditch once a tire is off the pavement. Narrow lane widths reduce the room available for driver correction and increase the potential for head on crashes. As indicated in Table 1.2-4, all shoulder widths are narrower than rural principal arterial design standards, and 91 percent of the roadway has less than 12-foot-wide lanes. In the project area, there is a high concentration of head-on crash locations, where records indicate there have been two or more head-on crashes per mile from 2001 to 2007 (DOT&PF 2010c, Thomas, personal communication 2011) .

Clear Zones. Inadequate clear zones could contribute to moose-related crashes that make up 12 percent of the crashes in the project area. The narrower-than-standard clear zones could diminish a driver's ability to see and avoid moose on the highway. In addition, narrower clear zones reduce the amount of time a driver has to make a correction to other traffic conditions and could contribute to run-off-the-road crashes. Vehicles that leave the roadway and hit an object (fixed object crashes) also contribute to severity of property damage and injury; adequate clear zones reduce these problems.

Access Points. The existing Sterling Highway has developed over time, with many driveways and side roads connecting directly to the highway. Between MP 45 and MP 60, 75 driveways and side roads connect to the Sterling Highway (see Map 1.2-5). In the most densely settled part of Cooper Landing (approximately between MP 47.0 and MP 51.0), there are 48 driveways and street intersections. These numerous access points can create unsafe conditions. Rear-end and angle crashes can occur when vehicles waiting to make left turns onto driveways or side streets are struck by vehicles following them, when turning vehicles fail to yield to oncoming traffic, or when vehicles improperly pass other vehicles waiting to turn.

Driveways cause conflict points that slow traffic and increase the chance of crashes.

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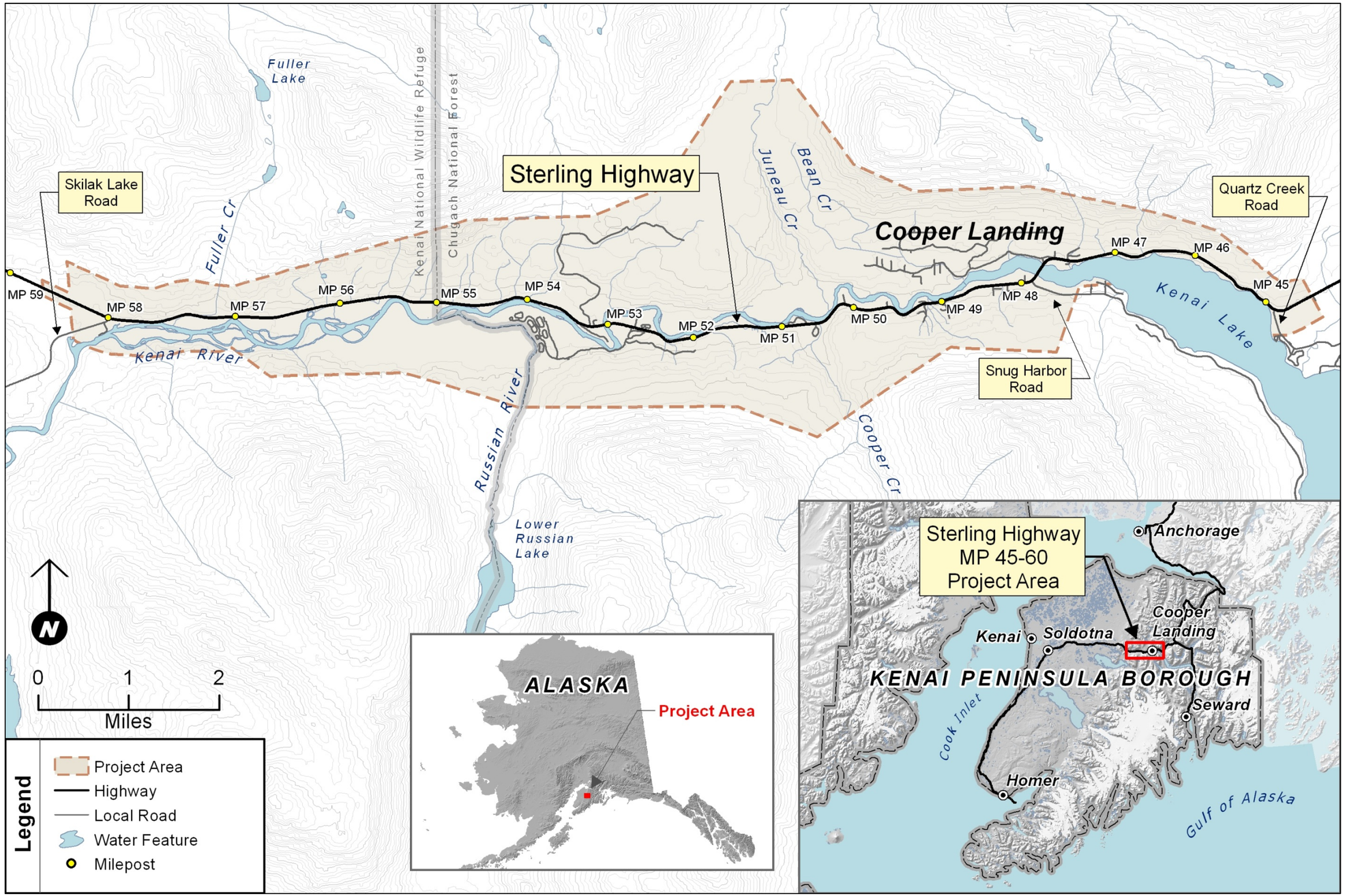

Map 1.1-1. Project vicinity map

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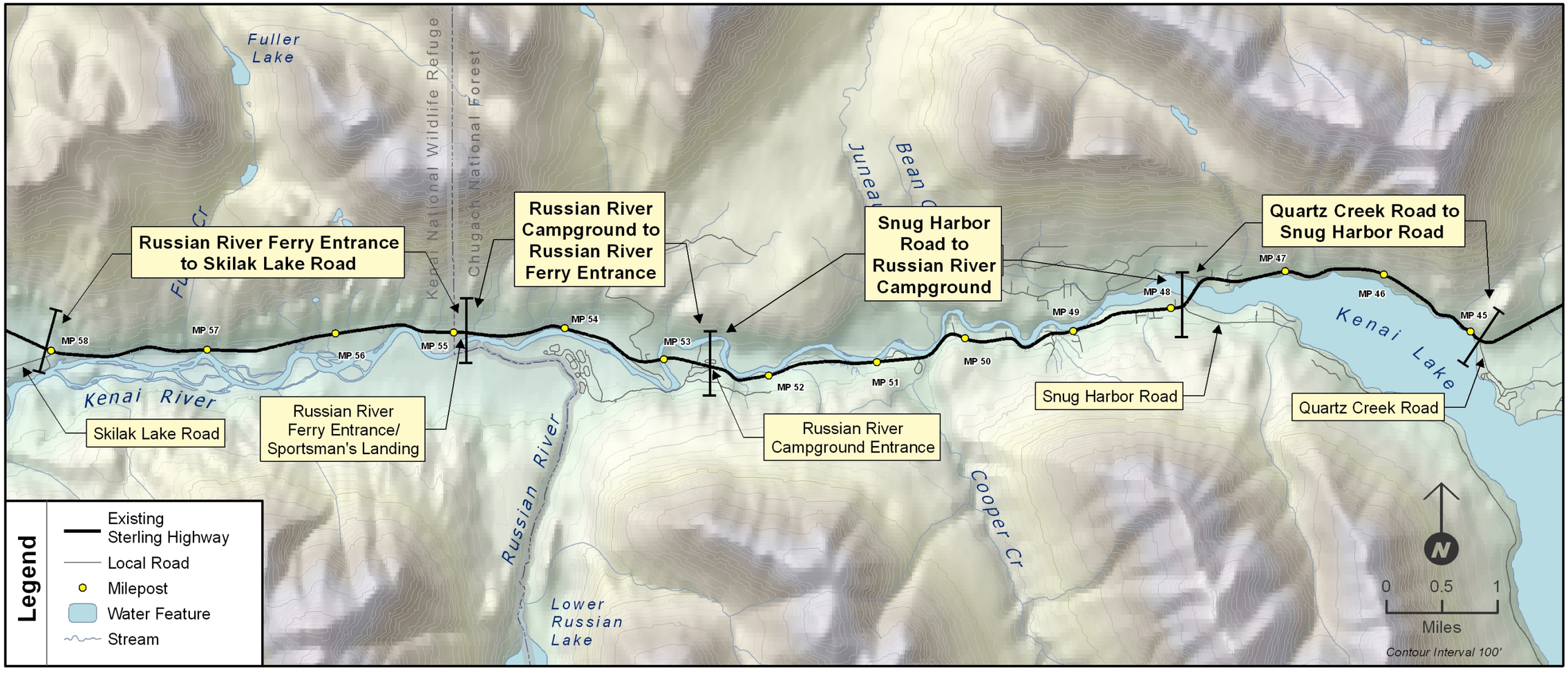

Map 1.2-1. Highway sections used to report DOT&PF traffic counts

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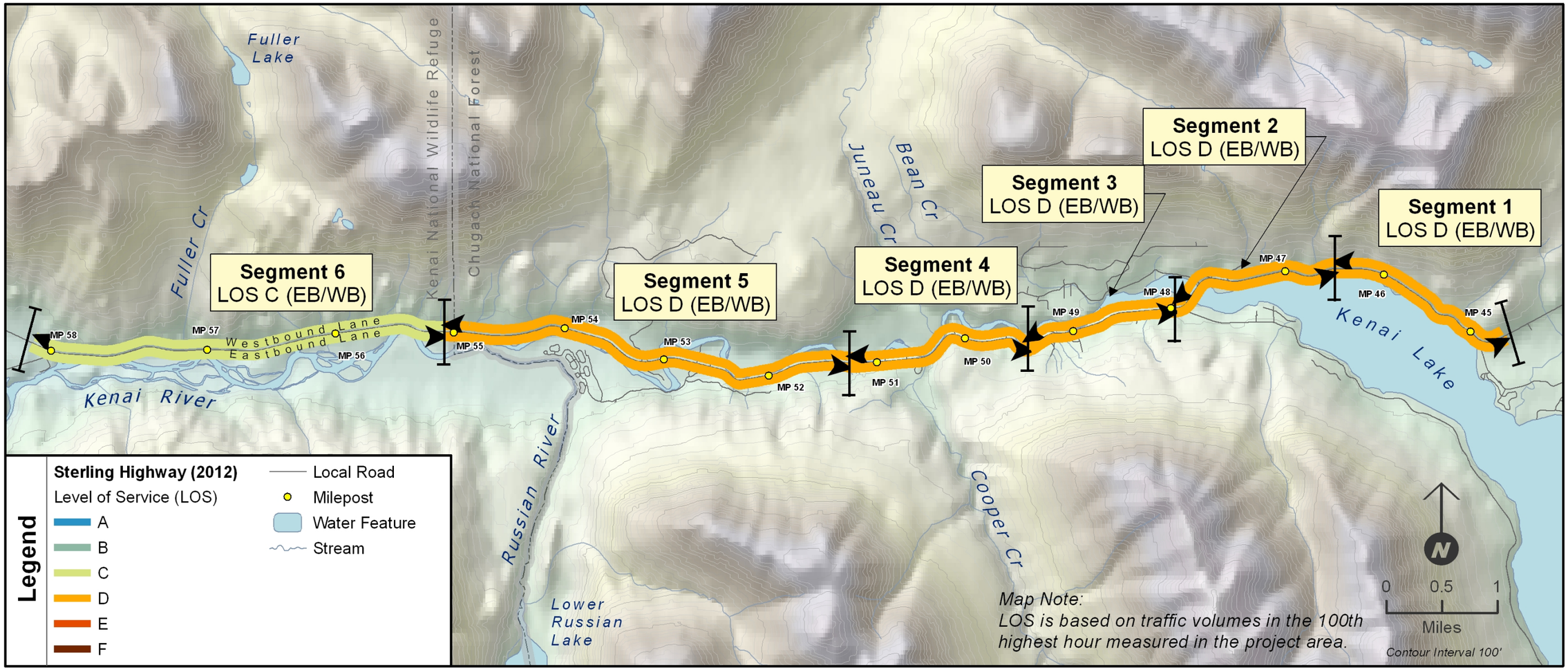

Map 1.2-2. Sterling Highway existing LOS, 2012

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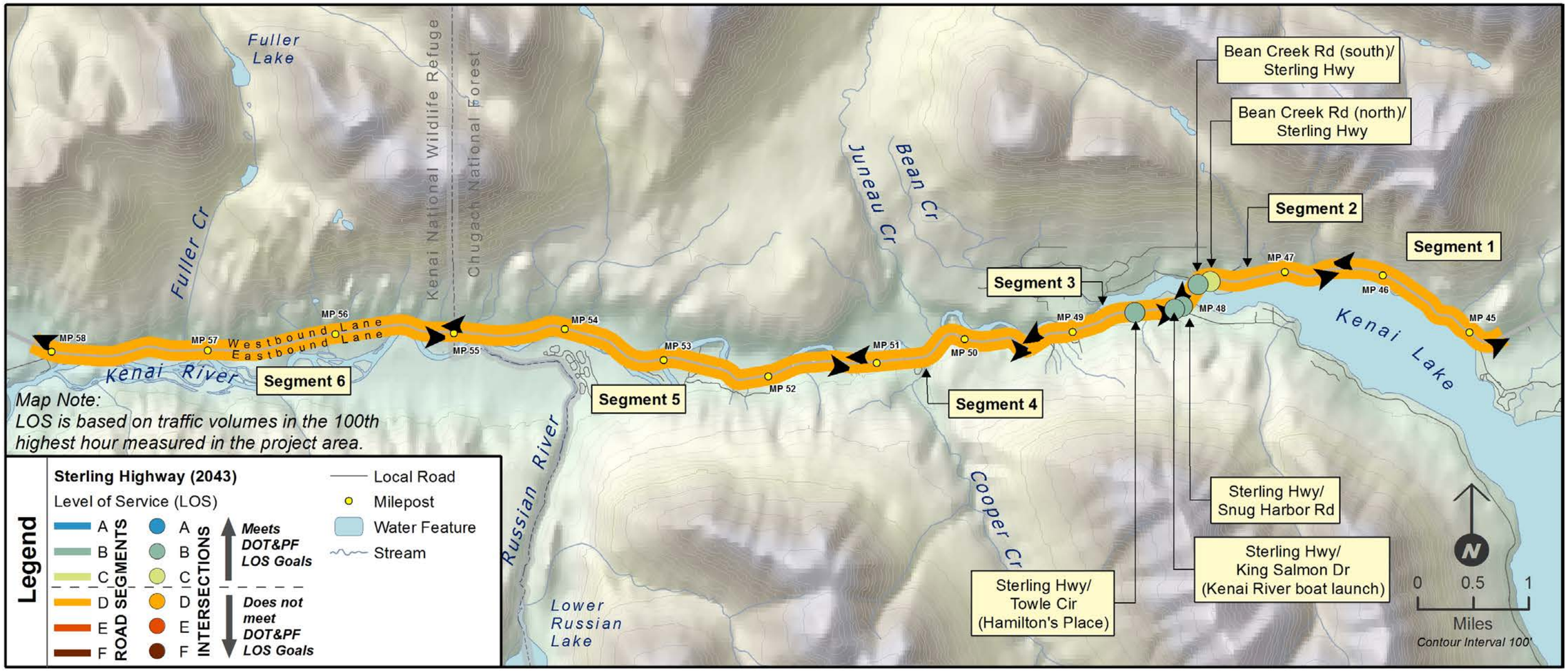

Map 1.2-3. Sterling Highway projected LOS, 2043

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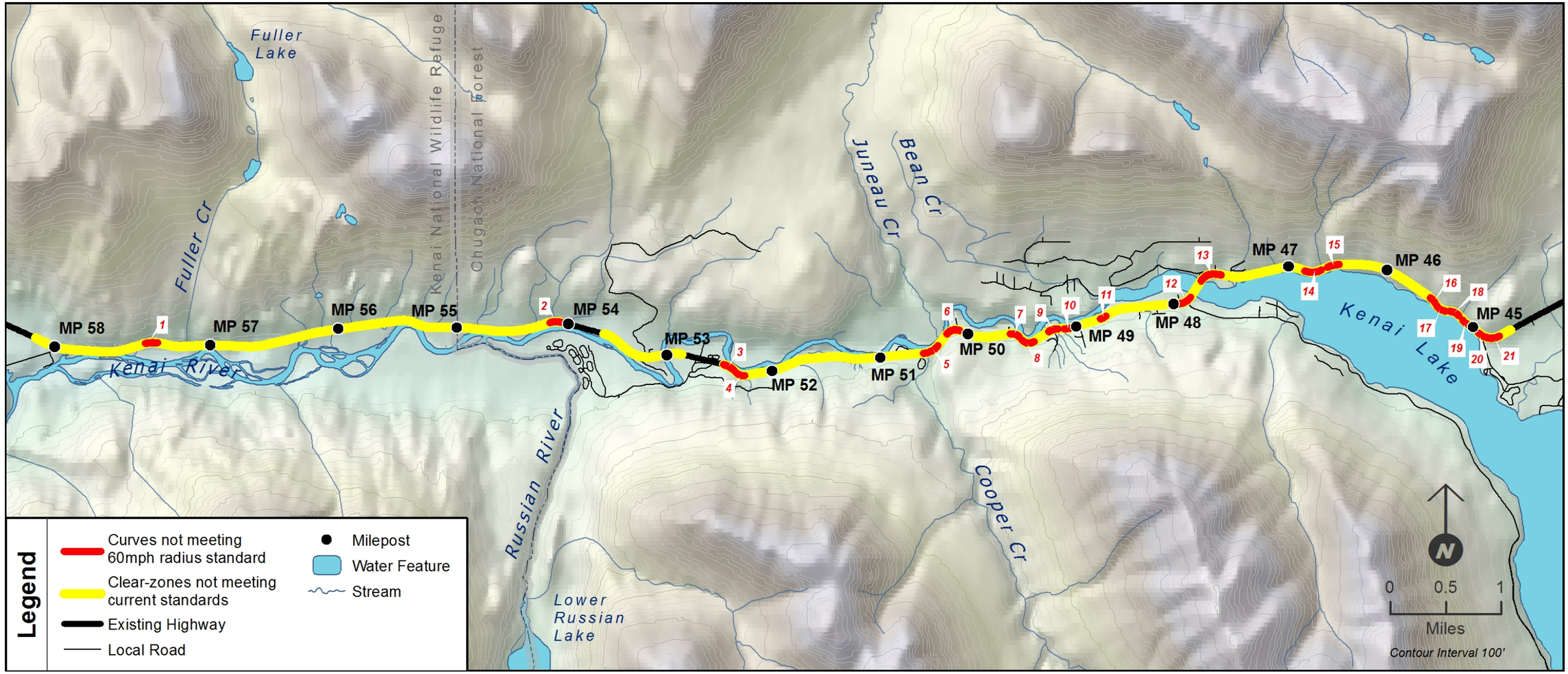

Map 1.2-4. Curves and clear zones in the project area

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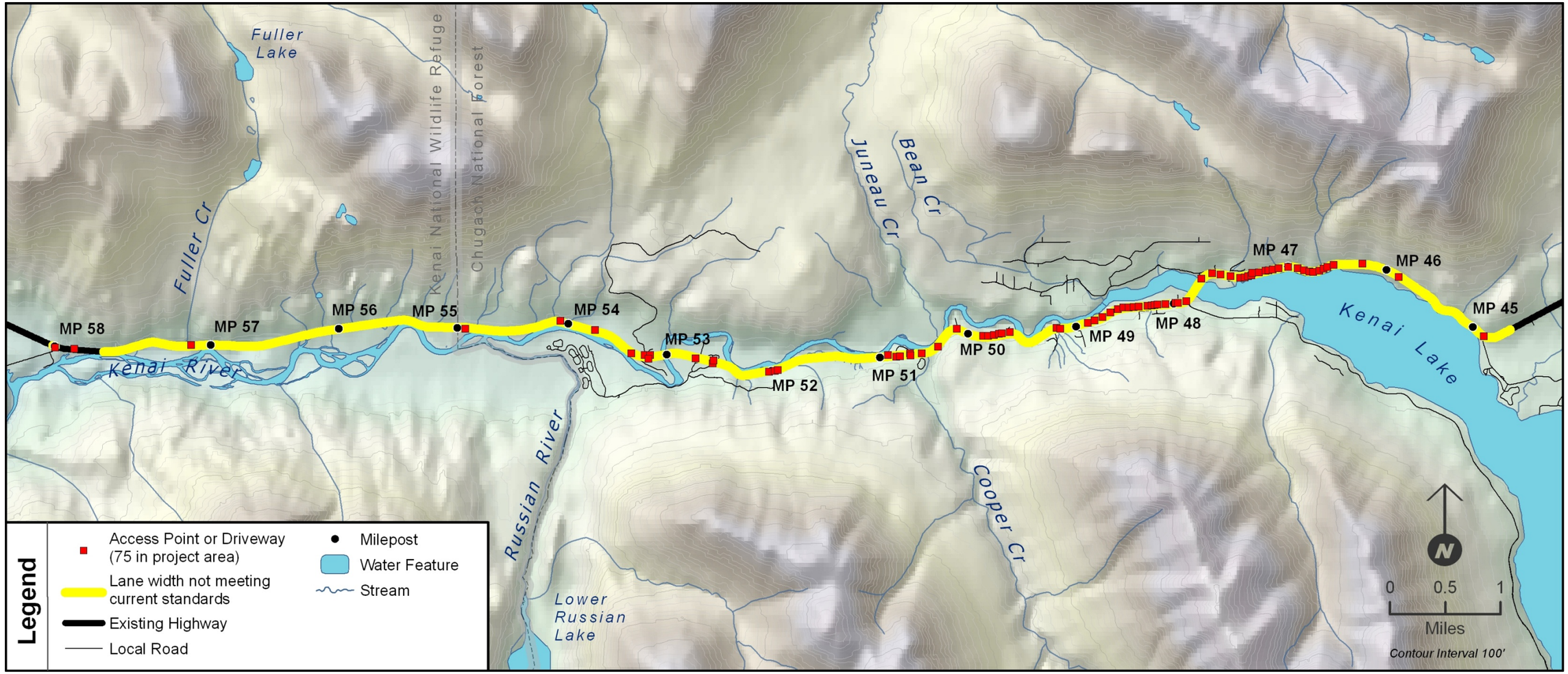

Map 1.2-5. Access points and narrow lane widths in the project area

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Sterling Highway MP 45–60
Draft SEIS and Draft Section 4(f) Evaluation

Chapter 2
Project Alternatives

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2 Alternatives

This chapter describes the evolution of the project alternatives and the alternative screening process. It describes how and why alternatives were identified for further evaluation in this Draft Supplemental Environmental Impact Statement (SEIS), those alternatives that the screening process identified as reasonable in greater detail, and those alternatives that were eliminated from further consideration. Section 2.1 defines terms used throughout the Environmental Impact Statement (EIS). Section 2.2 describes the alternatives evaluation process. Section 2.3 provides background on alternatives from previous EIS efforts and then presents a summary overview of alternatives considered in the current SEIS effort (Section 2.4). Details follow about those alternatives that were not carried forward and why (Section 2.5). The final part of the chapter details the No Build Alternative and the four "build" alternatives evaluated throughout the rest of this SEIS (Section 2.6).

2.1 Terminology Applicable to the Alternatives

All of the build alternatives would create a new highway. However, portions of each would follow the existing Sterling Highway, and portions would depart from the existing highway. This document uses the following terminology.

Existing highway (or existing road) refers to the Sterling Highway as it exists today.

Alternative refers to one of the five alternatives: the No Build, Cooper Creek, G South, Juneau Creek, and Juneau Creek Variant alternatives.

Build alternative refers to one of the four alternatives that would result in major construction. Each build alternative includes two segments of the existing Sterling Highway that would be completely rebuilt to remove sharp curves and add shoulders and passing lanes. Each of these alternatives also includes one segment that would cross land that is currently undeveloped, and in these areas a new highway would be built from scratch. These "segments" are not to be confused with segments 1–6 identified for traffic and safety purposes and discussed in Chapter 1.

Segment built on a new alignment refers to the segment of the alternative built all-new, off the existing alignment in a new location.

Segment built on the existing alignment refers to the two segments of each build alternative in which the existing highway would be rebuilt in the existing corridor. "Existing alignment" used in this document does *not* refer to a precise following of the existing highway centerline with the new highway centerline.

"Old" highway or "Old Sterling Highway" are used in quotation marks in certain circumstances to call out the segment of the existing highway that would not be altered. This terminology also is used to distinguish between the "segment built on a new alignment" and the "existing highway" at the intersection of the two where a short segment of the "existing highway" would be rebuilt to create a T intersection with the segment built on a new alignment.

MP refers to "milepost" or "mile point" and may refer to a specific milepost posted in the field (MP 55) or to a mile point between two mileposts (MP 55.5).

2.2 Alternatives Development Process

To identify reasonable alternatives for this SEIS, a screening process was established to evaluate the ability of potential project alternatives to meet the Purpose and Need (see Chapter 1) and other evaluation criteria. The evaluation criteria were developed by the Alaska Department of Transportation and Public Facilities (DOT&PF) and the Federal Highway Administration (FHWA) with input from agencies, community stakeholders, and interest-group stakeholders. This input was supplemented by communication with the broader community through specific outreach activities including an Internet-based survey. The evaluation criteria were made final after review and discussion by the Agency Consultation Committee and the Stakeholder Sounding Board. The DOT&PF formed these committees, respectively composed of regulatory agency personnel and project stakeholders from the public, to help review the project during development of alternatives (see Chapter 5, Comments and Coordination, for a description of the committees and their activities). The evaluation criteria consisted of the following:

- Consistency with the project's purpose and need;
- Potential physical environment effects, including impacts on natural resources (Kenai River, wetlands, fish, wildlife, vegetation, storm water runoff), aesthetics, and noise during project construction and operation;
- Potential social environment effects, including impacts to cultural and historical properties, trails, recreational properties, private property, economics, and subsistence, and consistency with local, regional, statewide, and Federal plans;
- Potential transportation-related effects, including impacts on vehicle traffic during construction and operation, freight movement, and the transportation system;
- Cost factors, including total project costs, annual operation and maintenance (O&M) costs, and 20-year life-cycle[1] costs; and
- Engineering feasibility.

The results of the screening process are fully documented in a technical report prepared for the project, titled *Evaluation Criteria and Alternatives Analysis* (HDR 2003a).

2.3 1982 and 1994 Draft EIS Efforts

Improving the Sterling Highway in the Cooper Landing area has been the subject of several efforts starting in the 1970s. These interrelated but discontinuous efforts resulted in a complicated set of previously considered potential alignments. A Draft EIS for a Milepost (MP) 37–60 project was approved in 1982 but was not approved as a Final EIS. A second Draft EIS for the same MP 37–60 project was approved in 1994 but was not approved as a Final EIS. DOT&PF and FHWA subsequently split the project and examined the MP 37–45 portion under a separate National Environmental Policy Act (NEPA) document. This SEIS is the continuation of the evaluation of the MP 45–60 segment.

[1] Life-cycle costs are defined as the overall estimated cost of a single alternative over the life of the project or a defined period. All of the expenses associated with the project that occur during its life are used to calculate the life-cycle cost. Life-cycle costs take into consideration capital development costs as well as annual O&M costs, cost of major rehabilitation required during the life of the project, and the value of money over time. The period used for the screening process was 20 years.

2.3.1 1982 Draft EIS

The 1982 Draft EIS addressed MP 37–60 of the Sterling Highway. The initial effort to develop alternatives resulted in several ways of negotiating or avoiding the most settled portion of the Cooper Landing community. All were variations on improving the existing alignment, and none strayed far from the existing alignment or from the Kenai River. By the time the 1982 Draft EIS was published, "Alternative B" was considered the "basic reconstruction proposal," addressing improvements throughout the length of the corridor. The other alternatives were minor variations, different from Alternative B for only short distances (see accompanying box "The Alphabet Soup of Alternative Names"). Other alternatives were developed and evaluated for the MP 37–45 segment (including the Quartz Creek area). Further information about the early effort is available in the 1982 Draft EIS (DOT&PF 1982), available on the project web site (sterlinghighway.net) and through DOT&PF.

The Alphabet Soup of Alternative Names

In 1982, the project began with alternatives called Alternative A, Alternative B, and so on through "E." When the 1982 Draft EIS was published, most of these alternatives were referred to in this alphanumeric way, but Alternative B was the primary alignment, Alternative C had been given the name "Bean Creek Alternative," and a "Juneau Creek Alternative" had been added without an alphanumeric designation (it crossed Juneau Creek near the confluence of Juneau Creek and the Kenai River, nearly 2.5 miles south of Juneau Creek Falls).

The 1994 Draft EIS carried forward the alphanumeric naming convention even though it considered all the A-E routes to be variations on a single "Kenai River Alternative." The 1994 effort added a "Juneau Creek F Alternative" (it crossed Juneau Creek 0.5 mile south of the falls) and a separate variation just called "Juneau Creek Alternative" (it crossed 1,000 feet north of the falls).

The current SEIS effort began in 2000 and carried the alphanumeric system forward once again. Although A-E were dropped in favor of the name "Kenai River Alternative," the "F" alignment that crossed Juneau Creek 0.5 mile south of the falls was retained, and two variations of a "G" alternative were added.

After analysis to determine which alternatives were reasonable and would be carried forward for full study in this EIS, the only alphanumeric name remaining as a reasonable alternative was the G South Alternative. The other reasonable alternatives have place-based names: Cooper Creek Alternative, Juneau Creek Alternative, and Juneau Creek Variant Alternative. The No Action Alternative also is carried forward.

2.3.2 1994 Draft EIS

The 1994 Draft EIS considered the same alternatives as the 1982 Draft EIS and developed several new alternatives. Again, alternatives were developed and evaluated for the entire MP 37–60 segment. These alternatives included two Juneau Creek alternatives through the MP 45–60 segment. Each alternative created a new alignment that would be separated from the existing highway for about 9 miles:

- The "Juneau Creek Alternative" crossed Juneau Creek 1,000 feet north of Juneau Creek Falls and 500 feet north of the intersection of the Resurrection Pass and Bean Creek trails (fully evaluated in the 1994 EIS). This alternative was the same as the Juneau Creek Wilderness Alternative shown on Map 2.3-1 at the end of this chapter.
- The "Juneau Creek Variant (F)" crossed the creek's canyon 0.5 mile south of the falls (considered not reasonable and not carried forward for full evaluation in the 1994 EIS).

This alternative was the same as the Juneau Creek "F" Wilderness Alternative shown on Map 2.3-1 at the end of this chapter.

In addition, the 1994 EIS carried forward a Resurfacing, Restoration, and Rehabilitation (3R) Alternative as a reasonable alternate. The Summary in the 1994 EIS stated: "to meet the requirements of Section 4(f), the 3R Alternative was developed as an avoidance alternative for the Kenai National Wildlife Refuge (KNWR) and the Resurrection Pass Trail." Section 2.5.1 further describes the 3R Alternative.

Further information on the 1994 Draft EIS is available in the document itself (DOT&PF 1994) and is available on the project web site (sterlinghighway.net) and through DOT&PF.

2.3.3 After the 1994 Draft EIS

In July 1995, DOT&PF published a Project Update. The Project Update explained that FHWA had approved splitting the Sterling Highway MP 37–60 Project into two separate, independent projects. The Project Update further explained that the improvement of the Sterling Highway from MP 37 to MP 45 was being expedited for construction, and it identified the Juneau Creek Alternative as the State's preferred alternative (at that time) for the MP 45–60 segment. The MP 37–45 segment was constructed and substantially complete in 2000. A final environmental document and a final decision for the MP 45–60 segment were not completed. The passage of time and changes in land ownership, land and river management, wildlife concerns, and transportation law required another draft EIS to supplement the previous work. A Notice of Intent (NOI) by FHWA to update the 1994 Draft EIS with a new draft SEIS was published in the *Federal Register* on May 19, 2003. The purpose of the NOI was to notify the public, Native groups, agencies, and local governments of the plan to prepare an SEIS due to the passage of time[2] since the 1994 Draft EIS for the Sterling Highway MP 37 to 60 Project. The current SEIS (this document) is the result.

2.4 Alternatives Considered for the Current SEIS: Summary

With the background presented in Section 2.3, above, the current alternative development effort began in 2000. Although this SEIS builds on previous work and knowledge of the area, the development and evaluation of alternatives started anew. DOT&PF and FHWA discarded old route preferences, reexamined the purpose and need for the project, and undertook substantial public and agency involvement to examine current issues and determine the scope of the SEIS, including development of alternatives. While this SEIS started with the previous work as a base, it evaluates and presents a fresh and current examination of area conditions, alternatives, and potential impacts.

Due to engineering advancements, changing community needs and perceptions, and updated projections of traffic, alternatives rejected during the 1982 or 1994 analyses were reconsidered (the Kenai River Alternative and Juneau Creek F Alternative). The 3R Alternative previously carried to the Draft EIS phase was also reexamined. These evaluations are described in the following summary (Section 2.4.1) and in Section 2.5.

[2] The original NOI for the Sterling Highway MP 37-60 EIS was published on June 12, 1980; another NOI was published on June 20, 1991 supporting the 1994 EIS.

A key outcome of reassessing the purpose and need (Chapter 1) and alternatives was recognition of the importance of the Sterling Highway meeting current rural principal arterial standards over the full length of the alternative. Relatively minor adjustments to the highway that would result in improvements but still not meet these standards were not considered reasonable because they would not satisfy the project purpose and need—to reduce congestion, meet current standards, and improve highway safety.

2.4.1 Summary of Alternatives Screening Process

The project team (DOT&PF and FHWA) considered multiple alternatives in an effort to satisfy the project purpose and need. These alternatives were derived from previous Draft EIS efforts in 1982 and 1994, suggestions made during the SEIS public and agency scoping process, and engineering efforts developed specifically for this SEIS. After much consideration of possible variations, the team finalized a full range of alternatives for consideration, which were published in an *Evaluation Criteria and Alternatives Analysis* (HDR 2003a). Following a public and agency review period and consideration of more than 100 comments received, a 2003 publication[3] documented decisions for alternatives to carry forward as reasonable alternatives for evaluation in this SEIS. Table 2.4-1 lists the alternatives evaluated in that analysis and identifies those that were carried forward as reasonable alternatives to be evaluated in the SEIS. Map 2.3-1 shows the 2003 alternatives considered but rejected, and Map 2.4-1 shows the alternatives that were advanced for a full evaluation in the SEIS, including the No Build Alternative. Sections 2.5 and 2.6 describe each alternative in further detail and describe the reasons for deciding not to carry several of them forward.

Table 2.4-1. 2003 results from alternatives screening

Alternative	Carried Forward for Evaluation in the SEIS?
No Build Alternative	**Yes**
Resurfacing, Rehabilitation, Restoration Alternative (3R)	No
Kenai River Alternative	No
Kenai River Walls Alternative	No
Cooper Creek Alternative	**Yes**
Russian River Alternative	No
G North Alternative	No
G South Alternative	**Yes**
Juneau Creek "F" Wilderness Alternative	**Yes**
Juneau Creek "F" Forest Alternative	No
Juneau Creek Wilderness Alternative	No
Juneau Creek Forest Alternative	No

Source: (HDR 2003a, HDR 2003d)

[3] "Recommendations from the *Evaluation Criteria and Alternatives Analysis* for the Sterling Highway Supplemental Draft Environmental Impact Statement Process" (HDR 2003d).

2.4.2 Summary of Post-2003 Alternatives Refinement

2.4.2.1 General Summary

Post-2003, the project team conducted further engineering refinement of those alternatives carried forward. This included further work for all alternatives to balance cut and fill of earth material for a more efficient construction process, examination of bridge types, additional cost estimating, impact assessment, agency consultation, engineering, development of impact mitigation measures and enhancements, and other efforts.

Of note, further consideration of the Juneau Creek "F" Wilderness Alternative resulted in a geotechnical report (R&M Consultants 2005) that recommended moving the location of the bridge over Juneau Creek Canyon several hundred feet north to a location with a more stable rock foundation for the bridge. Because other Juneau Creek alternatives had not been carried forward, and for simplicity, the "F" was dropped from the name, and this alignment with the altered bridge location is now called the Juneau Creek Alternative.

The U.S. Forest Service (USFS), as a cooperating agency, suggested that a full range of alternatives should include examination of the new proposed alignments with the additional removal of either the Schooner Bend Bridge or the Cooper Landing Bridge on the existing alignment, resulting in the existing alignment becoming a dead-end road. The *USFS-Suggested Alternatives Analysis* (HDR 2006b) determined that no combination of the EIS alternatives (Cooper Creek Alternative, G South Alternative, or Juneau Creek Alternative; described in Section 2.6) that included removal of either the Schooner Bend Bridge or the Cooper Landing Bridge would meet the project purpose for serving local traffic. Local traffic intending to get to recreational facilities along the existing highway (after removal of one of the two bridges) would have to travel in a loop a minimum of about 16 miles one way to reach popular destinations that are within 1–2 miles on the existing highway, such as the Resurrection Pass Trail and popular fishing holes such as Sportsman's Landing (HDR 2006b). For these reasons, the conceptual alternative was determined not reasonable, and this alternative is not discussed further in this SEIS.

The involvement of Federal Wilderness within the KNWR on the Juneau Creek Alternative prompted reexamination of the "Forest" alternatives. After careful engineering, the project team determined that design modifications for grade (so that the slope of the road would meet the standard) and for the intersection of the existing Sterling Highway and proposed new highway near Sportsman's Landing could be made to create a variant of the Juneau Creek Alternative that avoided the Wilderness and would be feasible from an engineering standpoint. Three different alignments were evaluated through the same screening criteria used in 2003 (HDR 2010a). As a result, a single alignment called the Juneau Creek Variant Alternative was added as a reasonable alternative. This ultimately affected the approach of DOT&PF and FHWA to the treatment of the Juneau Creek and Juneau Creek Variant alternatives; see Section 2.4.2.2 below for further explanation.

Refinements of alternatives resulted in the following list of alternatives fully considered in this SEIS:

- No Build Alternative
- Cooper Creek Alternative

- G South Alternative
- Juneau Creek Alternative
- Juneau Creek Variant Alternative

Map 2.4-1 shows all of these alternatives together on one map. Each of these alternatives is described in detail individually in Section 2.6.

2.4.2.2 Consideration of Juneau Creek Alternative

In January 2013, after analysis of the four build alternatives and after consultation with the agencies, DOT&PF sent a letter to the U.S. Fish and Wildlife Service (USFWS; KNWR) indicating that DOT&PF did not intend to select the Juneau Creek Alternative as the preferred alternative. This was because the Juneau Creek Alternative was the only alternative that would cross KNWR lands outside the existing right-of-way and the only alternative that would cross Federally designated Wilderness. The letter was prompted by a requirement for a specific process spelled out under Title XI of the Alaska National Interest Lands Conservation Act (ANILCA). DOT&PF had decided not to begin the Title XI process because there was no intention of selecting an alternative that would cross KNWR [lands protected under Section 4(f) of the Department of Transportation Act—the subject of Chapter 4] and Wilderness. Section 3.1.1.7 further explains the ANILCA process.

Cooperating agencies USFWS, USFS, and DNR objected to making what appeared to be a decision about the alternative before publishing the Draft SEIS. DOT&PF and FHWA have considered the comments, with the following results:

- FHWA and DOT&PF reconfirm their disclosure that the Juneau Creek Alternative is not likely to be selected as the preferred alternative but acknowledge that it technically could be selected.
- The Juneau Creek Alternative is fully evaluated in the Draft SEIS, and the ANILCA Title XI process has been initiated for this alternative by submitting Standard Form 299 to the Federal agencies with jurisdiction.

Why disclose that the Juneau Creek Alternative is not likely to be selected?

The Council on Environmental Quality regulations state that a Federal agency must disclose a preferred alternative when it has one. In this case, FHWA is disclosing that one of four reasonable build alternatives is not preferred. The evaluation process in the SEIS led to this conclusion.

DOT&PF and FHWA developed a full range of alternatives and took a hard look at those alternatives through a comprehensive evaluation and screening process in 2003. The screening process was undertaken with considerable engagement from agencies and the public. During this process, many alternatives were evaluated and eliminated.

For the three alternatives carried forward for full evaluation in 2003, FHWA and DOT&PF undertook additional engineering and environmental studies. The analysis evaluated variations of alignment to avoid or minimize impacts to sensitive resources. Such an examination is a part of FHWA's standard approach to alternatives evaluation, and in many cases this avoidance analysis is required by law or regulation—for example, wetlands avoidance and minimization under the Clean Water Act, and avoidance and minimization under the U.S. DOT Act Section 4(f).

Given the national value placed on designated Wilderness, the concerns regarding impacts to Wilderness raised during scoping and agency consultation, and FHWA's requirement to examine alternatives that avoid Section 4(f) property (KNWR), DOT&PF and FHWA conducted a detailed analysis of the Juneau Creek Alternative to seek variations of the alignment that would achieve the project purpose and need, would be technically feasible, and would satisfy the screening criteria that had been established for the project. Three avoidance variations were evaluated, and one was selected that best achieved the purpose and need while minimizing other impacts. The chosen alignment variation is the Juneau Creek Variant Alternative presented in this document. Once DOT&PF and FHWA had found a variation of the alignment that avoided impacts to the KNWR and Wilderness, they could have decided to no longer carry the original alignment through the full SEIS process.

Only reasonable alternatives are required to be fully evaluated in an EIS. Other alternatives that were eliminated from detailed study are only briefly described and information summarized about why those alternatives were eliminated. FHWA does not fully evaluate every possible variation of each alignment in an EIS. Once a feasible variation is found that meets the purpose and need and avoids/minimizes impacts, FHWA commits to and evaluates that alternative. As an example, when FHWA learned that the G South alignment would pass through a traditional cultural property (TCP), a similar avoidance analysis was conducted. An alignment variation was found that avoided the TCP and fully met engineering standards. FHWA and DOT&PF are no longer evaluating the alignment through the TCP. Similarly, in this case, FHWA could have dropped the original Juneau Creek Alternative from full consideration, because there are three other reasonable alternatives that avoided the Wilderness impact.

Because the Juneau Creek Alternative would impact KNWR and Wilderness, the Title XI process would need to be followed. The Title XI process for Wilderness is untested and would require an affirmative decision by the President of the United States and then a joint resolution of Congress within specified timeframes. Because of the inherent political uncertainty, the likelihood of securing a transportation right-of-way across Wilderness is a risk to the project. The risk is heightened given the presence of other reasonable alternatives that would not cross Wilderness. DOT&PF and FHWA believe that a reasonable person can conclude this process would have a low probability for success.

With the land designated as Wilderness, the magnitude of impact of the Juneau Creek Alternative would be substantial, and it is anticipated that the scope of concern regarding the project's impacts would expand from local/regional to national.

Moreover, USFWS is required under ANILCA to consider whether there are "economically prudent and feasible" alternatives that avoid the KNWR. USFWS has indicated they anticipate difficulty making such a finding, given the other alternatives under consideration.

Together, these circumstances constitute an unusual risk for this alternative and have contributed to the decision by DOT&PF and FHWA to announce that they are unlikely to pursue selection of the Juneau Creek Alternative as preferred as long as the land status remains Federally designated Wilderness.

Why fully evaluate the Juneau Creek Alternative?

Despite the process described above and the conclusion that it is unlikely DOT&PF and FHWA would select the Juneau Creek Alternative, the alternative *is* carried forward for full evaluation in this SEIS for the following reasons:

- Cook Inlet Region, Inc. (CIRI), a regional Alaska Native corporation, requested full evaluation of this alternative in meetings and in a letter (Cunningham 2010).
- The Juneau Creek Alternative would function best of all the alternatives from a traffic engineering standpoint.
- The alternative has long standing in the history of the project, and its evaluation has long been assumed by members of the public and agencies. It also provides a useful point of comparison with the other alternatives.

A request by CIRI (an Alaska Native corporation formed under the Alaska Native Claims Settlement Act) and later concerns expressed by cooperating agencies, prompted DOT&PF and FHWA to retain and fully evaluate the Juneau Creek Alternative. Retaining the original alignment would preserve options for CIRI as it works through other Alaska Native land claims issues and its land use plans in the area of the confluence of the Kenai and Russian rivers. Also, this alternative would avoid impacts to a 42-acre tract of CIRI land recently transferred from the Federal government, which would be affected by the Juneau Creek Variant Alternative. DOT&PF and FHWA are fully analyzing the alternative in part because it is possible that CIRI and USFWS would execute a land exchange that would remove the Wilderness designation in this area before project construction. Such an exchange was authorized by Congress in the Russian River Land Act (see Section 3.1.1.5), and CIRI stated in 2010 and 2013 project meetings that it intended to initiate the land exchange process.

Summary of Juneau Creek Alternative Process

FHWA seeks to provide full disclosure of the impacts of its projects and full disclosure of its decision-making process. FHWA was inclined to drop the original alignment through designated Wilderness, save for the input from Tribal entities and cooperating agencies. The Juneau Creek Alternative has been retained for full analysis in the EIS to preserve the opportunity to select it as a preferred alternative in the Record of Decision, whether or not the CIRI-USFWS land exchange ever occurs. No decision will be made final until FHWA signs the Record of Decision. Throughout the remainder of this document, the Juneau Creek Alternative is treated equally with all other alternatives.

2.5 Alternatives Considered and Not Advanced for Full Analysis

The following subsections describe reasons that some alternatives considered were eliminated from detailed study in this SEIS. Map 2.3-1 displays these alternatives. Sections 2.1 and 2.4 above summarize the evaluation process.

2.5.1 Resurfacing, Restoration, and Rehabilitation Alternative (3R)

A 3R Alternative was considered to be a reasonable alternative when the 1994 Draft EIS was prepared.

In transportation engineering, 3R projects are based on a safety analysis and generally consist of minor fixes to curves or intersections. 3R projects can include other relatively minor upgrades, such as paving or re-paving. Typically, little or no new right-of-way is required. In contrast, "4R" projects include "reconstruction" and involve complete reconstruction of an existing road (see accompanying box).

3R, 4R, and "Existing Alignment"

Continued use of the existing alignment, with improvements, has been a goal expressed by some members of the public and some agency representatives, particularly since the issuance of the 1994 Draft EIS. That Draft EIS introduced concepts of all-new alignments separated from the existing highway for 8-9 miles (the Juneau Creek alternatives) and contrasted them with a "3R" Alternative on the existing alignment. It appears there has been confusion ever since, not only by commenters but within project documents, equating "3R" with "existing alignment."

The 2003 *Evaluation Criteria and Alternatives Analysis* (HDR 2003a) furthered the confusion by explicitly labeling the 3R Alternative a "reconstruction" alternative. However, a 3R project by definition is a "resurfacing, rehabilitation, and restoration" project and not a full reconstruction type of project. "4R" is the term used when adding "reconstruction."

For this SEIS, the project team reconsidered the 3R Alternative presented in 1994 and determined it to be not reasonable because it would continue to be too winding, inefficient, and unsafe for the amount of traffic it needs to accommodate—a slow, congested road for through traffic and one difficult and unsafe for the community, as well as recreation users, both drivers and pedestrians, as described in the main text.

To satisfy the public interest in an alternative that stayed on the existing alignment, the project team also developed a reconstruction (4R) alternative that would meet all current standards for lane, shoulder, and clear-zone widths and for grades (road steepness), curves, and design speed while staying as close as possible to the existing alignment. That effort resulted in the Kenai River Walls Alternative, discussed below in the main text. It was found not reasonable based on engineering and construction problems and impacts to the Kenai River.

The 1994 3R Alternative was carried forward at that time primarily to provide an alternative that avoided Section 4(f) properties (see Chapter 4 for current information on Section 4(f)). The project purpose and need at that time was general—"provide a safe modern highway"—and identified problems including lack of shoulders and congestion but did not require meeting standards. For purposes of the current SEIS, the 3R Alternative is no longer considered a reasonable alternative because it would not meet the current project purpose and need of reducing congestion, improving highway geometrics to current standards, and adequately improving safety of the National Highway System (NHS) in the Cooper Landing area.

The 1994 Draft EIS indicated that the Juneau Creek Alternative and the 3R Alternative each "would provide a modern highway meeting (then-) current design standards." However, the standards for the two types of improvement were not equal; the standards for a 3R project were (and still are) different than those for full reconstruction or construction on a new alignment. The 3R Alternative was noted in the 1994 EIS as "essentially the minimum development alternative" and would have had two 12-foot lanes and two 6-foot shoulders. Safety analysis indicated that one low-speed curve, at MP 47.5 (just north of the Cooper Landing Bridge), would have been improved. The 1994 Draft EIS stated: "Accident rates at the remaining low speed curves were not high and consequently no alignment improvements are required." The Sterling Highway

under a 3R alternative would have remained a winding road with caution and advisory speed limit signs in the 30-45 mph range on several curves and for several miles. The alternative would have had narrower shoulders than the 1994 Juneau Creek Alternative.

In 1994, DOT&PF would have accepted the 3R Alternative as a stop-gap measure. The 1994 Draft EIS acknowledged that "3R projects generally are constructed to preserve and extend the service life of roadways, while enhancing safety conditions" without necessarily bringing the highway fully up to then-current rural principal arterial standards. The 1994 Draft EIS acknowledged that the 3R Alternative was not equal to full reconstruction alternatives and would not have had the same design life: "(It) is likely that some additional improvements may be required within 10 to 15 years after construction of this alternative. Additional improvements could range from another 3R project to full reconstruction."

In contrast, the 1994 Juneau Creek Alternative would have had two 12-foot lanes and two 8-foot shoulders, and side slopes and clear zones that met standards for safety. All curves would have met standards for safe use at 60 mph, and the alternative was designed to last a minimum of 20 years without need for modification, except for repaving.

While a 3R alternative may have been acceptable in 1994, the passage of time and increases in traffic have led DOT&PF to determine that fully meeting rural principal arterial standards for roadway geometry is important. Therefore, a 3R solution is no longer acceptable. The project purpose and need has been made more explicit and detailed to indicate that meeting geometric standards for a rural principal arterial is a requirement of the project.

A *Traffic Analysis Assessment* (HDR 2001a) for the current SEIS and the *Evaluation Criteria and Alternatives Analysis* (HDR 2003a) addressed the 3R Alternative but did not pass it through the alternatives screening process because, by definition, it did not meet the SEIS purpose and need. The *Alternatives Analysis* document stated:

> (The 3R Alternative) is no longer a viable alternative because it would not improve highway geometrics to current standards or adequately improve traffic flow through the Cooper Landing Area. The original traffic analysis conducted on the 3R Alternative for the 1994 DEIS only examined average annual traffic without consideration for peak season traffic volumes. After reanalyzing the 3R Alternative (in the *Traffic Analysis Assessment*) with peak season (summer) traffic data, it was determined that the 3R Alternative would not alleviate peak season traffic conditions. (HDR 2003a)

As an alternative that would have realigned only one particularly unsafe curve without meeting full geometric standards, the 3R Alternative would not satisfy today's identified need to bring the highway to current rural principal arterial standards for highway geometry. It also would not adequately improve safety because it would retain tight curves and variable speed postings. This alternative would also retain conditions associated with multiple driveways that would contribute to congestion and safety conflict points on this NHS route. Based on the purpose and need expressed in this SEIS (Chapter 1), the 2001 *Traffic Analysis* Assessment, and the 2003 *Alternatives Analysis*, the 3R Alternative is not further addressed in this SEIS.

2.5.2 Kenai River Alternative

The Kenai River Alternative would have been located mostly on the existing alignment along the Kenai River but included four new bridges crossing the Kenai River, one new bridge over Juneau Creek near its mouth, and replacement of the Schooner Bend and Cooper Landing bridges. The

Evaluation Criteria and Alternatives Analysis and subsequent analysis (HDR 2003a, 2003d) found the Kenai River Alternative to be unreasonable. It was eliminated from further consideration because of its impacts to the Kenai River and Juneau Creek associated with the new bridges, cultural and private properties, and the lower Juneau Creek delta, an area that is important for bears. Additionally, this alternative had a relatively poor level of service (LOS) for traffic in the design year.[4] This, in combination with the other factors, made it not reasonable.

2.5.3 Kenai River Walls Alternative

The Kenai River Walls Alternative was an attempt to design an alternative that would be a full reconstruction of the highway using its existing alignment. Similar to the Kenai River Alternative, the Kenai River Walls Alternative would have closely followed the Kenai River through the central section of the project area. This alternative provided an alternative alignment to the 2-mile section where the Kenai River Alternative (see Section 2.5.2 above) crossed the Kenai River four times in close succession, resulting in unreasonable impacts to the river (a State park). The Walls alternative would have remained on the south side of the Kenai River and generally followed the existing roadway. This alternative was designed as a complete reconstruction alternative (4R project) that would meet the purpose and need of this project (see sidebar explanation of 3R, 4R, and the existing alignment in Section 2.5.1, above).

The goal was to maintain a 60-mph design speed and create no new Kenai River crossings. To achieve this goal, retaining walls would have been required on both sides of the roadway between MP 49 and MP 50.5. The walls on the north (Kenai River) side of the highway would generally be 15 feet high by 800 feet long. The walls on the south side would be 50 feet high on average but would reach a maximum of 165 feet high and 1.1 miles long.[5] The *Evaluation Criteria and Alternatives Analysis* and subsequent analysis (HDR 2003a, 2003d) found the Kenai River Walls Alternative to be unreasonable, and it was eliminated from further consideration because of unusual engineering challenges (particularly unstable soils requiring unusually high walls with risk of failure onto the highway and into the Kenai River), impacts to existing highway traffic during construction, high life-cycle costs, potential impacts to the Kenai River and associated natural resources and recreational uses, and impacts to cultural resources and private properties. Additionally this alternative had a relatively poor LOS for traffic in the design year (see discussion about forecasted LOS in the design year in Section 1.2.2.1 and Table 1.2-3). This in combination with the other factors made it not reasonable.[6]

[4] At that time, the design year was 2025. It has since been extended to 2043 to provide a 25-year projection from the expected EIS decision.

[5] Engineering challenges associated specifically with the soils and required walls are detailed in two reports on file with DOT&PF, dated June 3, 2003 and September 18, 2003. These reports were prepared by a team of roadway and structural engineers who interviewed wall engineering specialists across the United States and internationally.

[6] The Cooper Creek Alternative is similar to the Kenai River Walls Alternative in that it presents a full reconstruction alternative that, for more than 70 percent of its length, uses the existing alignment. It deviates from the existing alignment to the south of Cooper Landing, routing around the "walls" area, where the ability to construct high walls is not recommended. Section 2.6.3 describes the Cooper Creek Alternative.

2.5.4 Russian River Alternative

The Russian River Alternative would have similarities to the Cooper Creek Alternative that is carried forward for full evaluation in this SEIS (see Section 2.6.3). The goal was to find a road corridor that remained on the south side of the Kenai River between Kenai Lake and Sportsman's Landing, skirting south of the community and recreational driveways. From east to west, the Russian River Alternative would have departed the existing highway at the Cooper Landing Bridge and climbed the slope south of the Cooper Landing community (similar to the Cooper Creek Alternative, see Section 2.6.3). It would have crossed Cooper Creek on a high bridge and traversed the hillside, descending to cross the Russian River on a new bridge. It then would have paralleled a major power transmission line across KNWR lands to the Kenai River and crossed the river on a new bridge downstream of Sportsman's Landing and the Russian River Ferry, tying into the existing alignment near MP 55.5. The Russian River Alternative would have constructed 8 miles of new highway and three new major bridges. The *Evaluation Criteria and Alternatives Analysis* and subsequent analysis (HDR 2003a, 2003d) found the Russian River Alternative to be unreasonable. It was eliminated from further consideration because of high life-cycle costs; potential impacts to the Kenai and Russian rivers and Cooper Creek, their associated natural resources, and their recreational uses (e.g., camping and fishing in the Russian River Campground and Sportsman's Landing area); substantial impacts to cultural resources, particularly the Sqilantnu Archaeological District; and lack of public and agency support.

2.5.5 G North Alternative

The G North Alternative would have avoided community impacts by skirting north of developed areas of Cooper Landing (much the same purpose as the 1982 C and D alternatives). The G North Alternative would have followed and improved the existing alignment to MP 46.3 and then continued across the hillside north of Cooper Landing before descending to crossings of Bean Creek, Bean Creek Trail, lower Juneau Creek (a long bridge), and the Kenai River (a new bridge). The G North Alternative would have rejoined the existing alignment near MP 51.5, just east of Gwin's Lodge, and would have improved the existing alignment to the MP 58 area near Skilak Lake Road. The G North Alternative would have been similar to the G South Alternative (see Section 2.6.4) but located slightly farther north and higher on the slope above Cooper Landing. The new crossings of the Kenai River and Juneau Creek were at the same locations as in the G South Alternative, but the new Bean Creek crossing was farther to the north.

The *Evaluation Criteria and Alternatives Analysis* and subsequent analysis (HDR 2003a, 2003d) found that, while the G North Alternative and G South Alternative had relatively high life-cycle costs and involved new crossings of Bean and Juneau creeks and the Kenai River, they avoided the Resurrection Pass National Recreation Trail and KNWR Wilderness, which were compelling reasons to further study these alternatives. The G South Alternative was recommended for further study in the Draft SEIS because it had a better LOS for traffic in the design year than the G North Alternative; however, there was little to distinguish the two alternatives or justify carrying both forward. The G North Alternative was not carried forward, and is not discussed further in this SEIS.

2.5.6 Juneau Creek "F" Forest Alternative

The Juneau Creek "F" Forest Alternative would have been similar to the Juneau Creek "F" Wilderness Alternative. The "F" Wilderness Alternative is carried forward in this SEIS with

slight modifications and renamed as Juneau Creek Alternative (see Section 2.6.5). The only difference between "F" Forest Alternative and "F" Wilderness Alternative was that, on average, the "F" Forest Alternative would have had slightly steeper grades (road slopes or hills) west of Juneau Creek to avoid KNWR designated Wilderness land. It would have tied into the existing alignment on Chugach National Forest land rather than within the KNWR. The Juneau Creek "F" Forest Alternative would have departed the existing alignment near MP 46.3 (similar to G North; see Section 2.5.5) and would have traversed the hillside north of Cooper Landing, climbing to a crossing of Juneau Creek Canyon on a long bridge located about 0.5 mile south of Juneau Creek Falls and outside the southern boundary of the USFS Juneau Falls Recreation Area that surrounds Juneau Creek Falls. West of Juneau Creek, the alternative would have descended to the Sportsman's Landing area at grades of 6–7 percent, meaning the slope of the road would have been too steep to meet current standards. The alignment would have rejoined the existing alignment at MP 55 (at Sportsman's Landing).

The *Evaluation Criteria and Alternatives Analysis* and subsequent analysis (HDR 2003a, 2003d) found the Juneau Creek "F" Forest Alternative to be unreasonable, and it was eliminated from further consideration because of traffic impacts at the intersection near Sportsman's Landing, an inability to meet current design standards for grade, and a lack of agency and public support. Two intersections—one for the existing Sterling Highway and one for Sportsman's Landing—would have been located at the base of a long hill. Sportsman's Landing (also the access for the Russian River Ferry) is the focal point for much of the fishing activity at the confluence of the Russian and Kenai rivers, and traffic, cars parked on the shoulder, and random pedestrian traffic on the highway are known safety issues in this area in mid-summer. Placing standard T-intersections with high seasonal use in close proximity would not improve the current situation, especially when coupled with grades in excess of standard. These factors contributed to the finding that this alternative was not reasonable. The Juneau Creek Variant Alternative (see Section 2.6.6) serves similar purposes and is designed to resolve the problems identified with the "F" Forest Alternative.

2.5.7 Juneau Creek Wilderness Alternative

The Juneau Creek Wilderness Alternative would have been similar in overall concept to the Juneau Creek "F" alternatives, departing the existing alignment at approximately MP 46.3, but it would have climbed farther up the hillside to cross Juneau Creek on a short bridge located about 1,000 feet north of Juneau Creek Falls. To accomplish this would have required a large horseshoe curve extending north before the alignment began a descent to rejoin the existing alignment near MP 55.6. The Juneau Creek Wilderness Alternative would have avoided the grade and intersection issues of the Juneau Creek "F" Forest Alternative and Juneau Creek Forest alternative (see Sections 2.5.6 and 2.5.8) by running farther west into the KNWR before rejoining the existing alignment. The Juneau Creek Wilderness Alternative would have required right-of-way from the KNWR Mystery Creek Wilderness area. This alternative would have crossed the USFS Juneau Falls Recreation Area withdrawal that surrounds Juneau Creek Falls, crossed the intersection of the Resurrection Pass and Bean Creek trails, and located the new roadway high in the Juneau Creek Valley, an area that is relatively undisturbed by the settlement or logging that have occurred farther south. In addition, this alternative would have operated at a substantially lower LOS than the Juneau Creek "F" Wilderness Alternative that would have been located on the same alignment except for the location of the Juneau Creek crossing and the large horseshoe curve. The *Evaluation Criteria and Alternatives Analysis* and subsequent analysis

(HDR 2003a, 2003d) did not recommend the Juneau Creek Wilderness Alternative for further study in the SEIS.

2.5.8 Juneau Creek Forest Alternative

The Juneau Creek Forest Alternative would have been similar to the Juneau Creek Wilderness Alternative (see Section 2.5.7) and would have departed the existing alignment at the same location (MP 46.3), created a horseshoe curve extending north up Juneau Creek, and crossed Juneau Creek in the same location about 1,000 feet north of Juneau Creek Falls. The descent would have diverged from the Juneau Creek Wilderness Alternative, with grades of 6–7 percent (too steep to meet current standards). The alignment would have rejoined the existing highway at MP 55 (Sportsman's Landing) to avoid KNWR designated Wilderness land. The *Evaluation Criteria and Alternatives Analysis* and subsequent analysis (HDR 2003a, 2003d) found the Juneau Creek Forest Alternative to be not reasonable, and it was eliminated from further consideration because of the impacts at the intersection near Sportsman's Landing, an inability to meet current design standards for grade, and lack of agency and public support (same reasons as Juneau Creek "F" Forest Alternative; see further discussion in Section 2.5.6 above). The Juneau Creek Variant Alternative (Section 2.6.6) was designed to serve similar purposes near the KNWR boundary and to resolve the problems identified with the "Forest" alternatives.

2.6 SEIS Alternatives Advanced for Full Analysis: Detailed Description

The five alternatives advanced for full evaluation in this SEIS—No Build, Cooper Creek, G South, Juneau Creek, and Juneau Creek Variant—are shown together on Map 2.4-1 and individually on Maps 2.6-1 through 2.6-6. Each alternative includes temporary construction areas, for construction staging and disposal of unusable earth materials, as shown on Map 2.6-7. The following sections describe each alternative in detail. The results of environmental analysis for these five alternatives are explained throughout this SEIS. Chapter 3 presents the impacts for each of the alternatives (in the Environmental Consequences section for each resource), and a comparative summary of impacts appears in the Executive Summary for this SEIS.

The alternatives share common termini at MP 45 and 60 (the actual limits of construction would be approximately MP 44.5 at the eastern end and MP 58.2 at the western end). The selection of logical termini is discussed in Chapter 1.

For all the build alternatives, anywhere the alternative overlies or follows the existing alignment, the existing alignment would be reconstructed with a wider, straighter highway built to modern rural principal arterial standards. Anywhere the alternative departed substantially from the existing alignment, the existing highway would become the "Old Sterling Highway" and would remain in service as a local road, and maintenance would remain the responsibility of the DOT&PF. In these areas, this project would not alter the "old" highway. However, DOT&PF would undertake routine maintenance, repaving, safety upgrades, bridge replacements, and other work over time to maintain the old highway. The old highway segment left by each build alternative would have a much reduced traffic load (estimated at about 30 percent of current and projected traffic) and would function as a local collector road serving as access to the community and recreation destinations.

2.6.1 No Build Alternative

NEPA requires an EIS to describe and analyze the impacts of no action, or no build, as a benchmark that allows for comparison of the degree of environmental effects of the various project alternatives (CEQ 1981).

Under the No Build Alternative (Map 2.6-1), the highway would remain much as it is today, but some major maintenance and already programmed work is assumed to occur:

- Pavement is assumed to be replaced twice.
- The three project-area bridges are assumed to be replaced because of age.
- A programmed project to improve a curve at MP 45 would occur.

The highway under a No Build scenario would remain a two-lane highway with 11-foot lanes. Shoulders would remain 0–2 feet wide. Clear zones and slopes alongside each shoulder would remain as they are and would not achieve current design standards. Normal highway maintenance would continue and some major maintenance is assumed to occur as part of DOT&PF's asset management programs.

The Sterling Highway in the MP 45–60 area received a thin Hot Mix Asphalt Overlay during the summers of 2013 and 2014; such an overlay has an expected life of 5–12 years. Under the No Build Alternative, reporting, monitoring, and maintenance of the highway surface condition would continue, and two asphalt overlays are assumed to occur by 2043 (the future year for which the project is being designed).

Because of the ages of the bridges on the Sterling Highway in the project area, these bridges are assumed to be replaced prior to 2043. The Cooper Creek Bridge was built in 1955. The Schooner Bend Bridge over the Kenai River was built in 1964. The Cooper Landing Bridge over the Kenai River was built in 1965 (DOT&PF 2009a). By 2043, all three of these bridges would be past the typical 50- to 75-year bridge design life. Although there currently is no schedule for replacement, for purposes of this SEIS, it is assumed all would be replaced by 2043.

The 2013–2015 Statewide Transportation Improvement Plan includes a project to realign the Sterling Highway at one curve in the project area, at MP 45-46. The scope of this project is to realign this segment of the Sterling Highway to improve sight distance and safety. As a programmed project, this realignment would occur even if the final decision resulting from this Sterling Highway MP 45-60 SEIS was to select the No Build Alternative. (This realignment would be incorporated into the Sterling Highway MP 45–60 Project if a build alternative were selected.)

The eventual repaving and bridge replacements described above for the No Build Alternative also would occur on the remnant section of "old" highway, as needed, if one of the build alternatives were selected. These are basic tasks necessary to keep the "old" highway operational. However, because the "old" highway would carry less traffic, the timeframe for bridge replacement and repaving likely would be extended, and the frequency of repaving likely would be reduced. The costs and associated impacts of the No Build Alternative activities are not considered part of the proposed project (DOT&PF is not seeking environmental clearance for these activities through this EIS). Because these activities are reasonably foreseeable, the impacts and costs with them are presented principally in Section 3.27, Cumulative Impacts.

2.6.2 Design Criteria Applicable to the Build Alternatives

Each of the four build alternatives being evaluated for the project—the Cooper Creek, G South, Juneau Creek, and Juneau Creek Variant alternatives—has been engineered based on guidelines from the *Alaska Preconstruction Manual* (DOT&PF 2005) and *A Policy on Geometric Design of Highways and Streets* (AASHTO 2004). These documents lay out the basic standards for highway design of rural principal arterials such as the Sterling Highway in Alaska and nationally.

Specific project design criteria are provided in the *Preliminary Engineering Report* (HDR 2014a) and are summarized in Table 2.6-1.

Table 2.6-1. Project design criteria

Design Element	Value
Functional classification	Rural principal arterial
Design year	2043
Design speed/terrain	60 mph/varies
Allowable grade maximum/ minimum	6 percent maximum/ N/A (0 percent)
Width of traveled way	24 feet (two 12-foot lanes)
Width of shoulders	8 feet
Degree of access control	Purchase access rights to control access along any segment built on new alignment
Illumination/street lighting	Major intersections
Curb	None
Bicycle provisions	Shoulders
Pedestrian provisions	Shoulders
Passing lane width	12 feet
Vertical clearance	16.5 feet
Clear zone	30 feet

Source: HDR (2014a).

The proposed build alternatives consist of a two-lane highway with paved shoulders, passing lanes, and turning lanes. Travel lanes would be 12 feet wide, paved shoulders would be 8 feet wide (adequate for safe bicycle and pedestrian use), passing lanes would be 12 feet wide, and all major intersections would have right- and left-turn lanes. None of the alternatives would involve construction of interchanges. The "old" highway would intersect new segments within each alternative via a T-intersection with stop signs on the "old" highway.

Figure 2.6-1, Figure 2.6-2, and Figure 2.6-3 illustrate the paved highway width in locations with different proposed cross-sections:

- Two lanes with shoulders - 40 feet (applicable where no passing lanes are proposed)
- Three lanes with shoulders - 52 feet (applicable where there are passing lanes in one direction)
- Four lanes with shoulders - 64 feet (applicable where there are passing lanes in both directions)

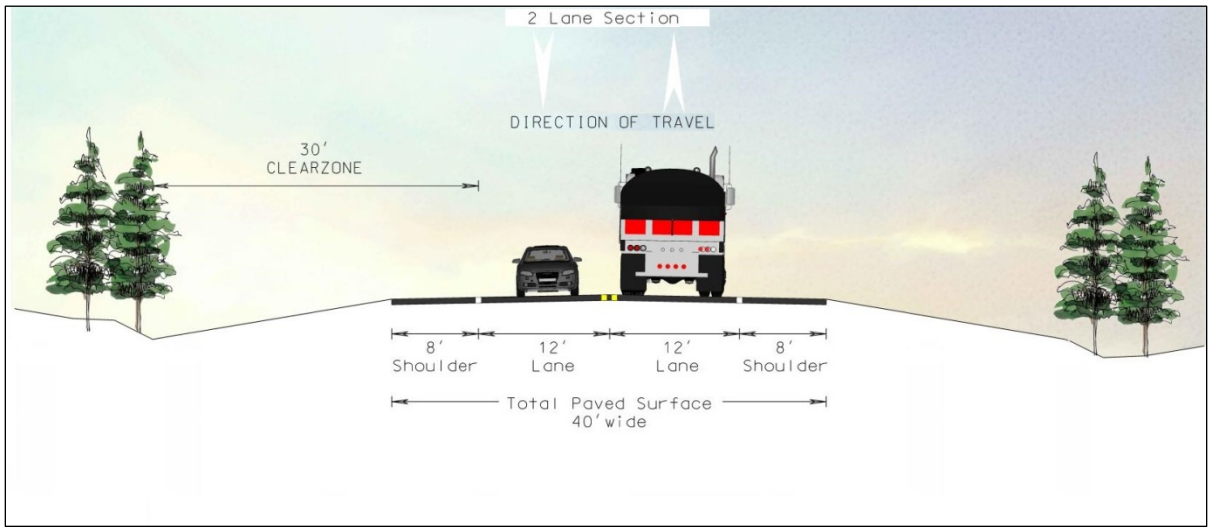

Figure 2.6-1. Typical two-lane cross section of a build alternative

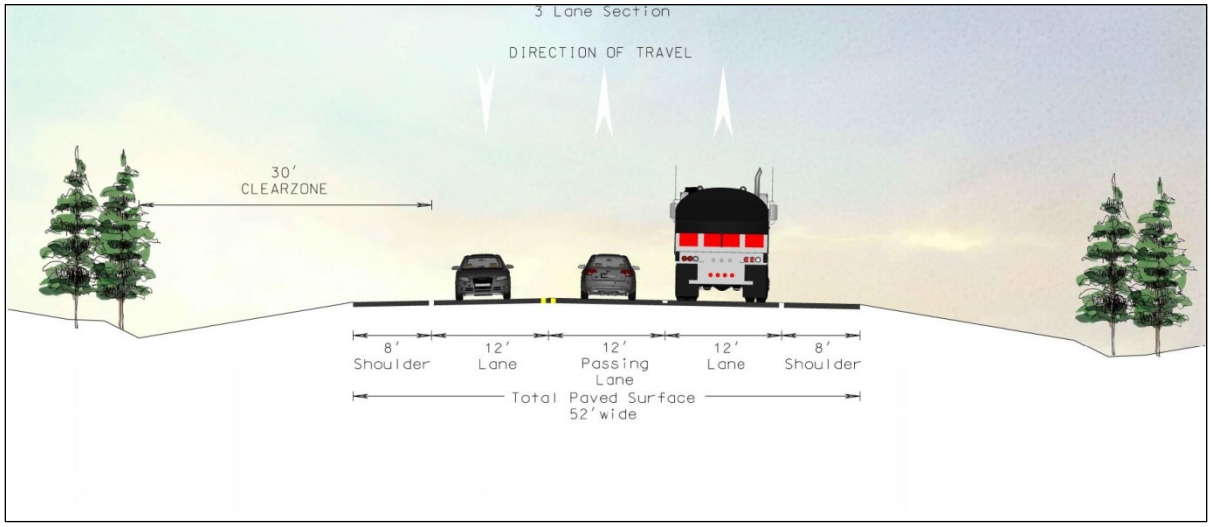

Figure 2.6-2. Three-lane cross section

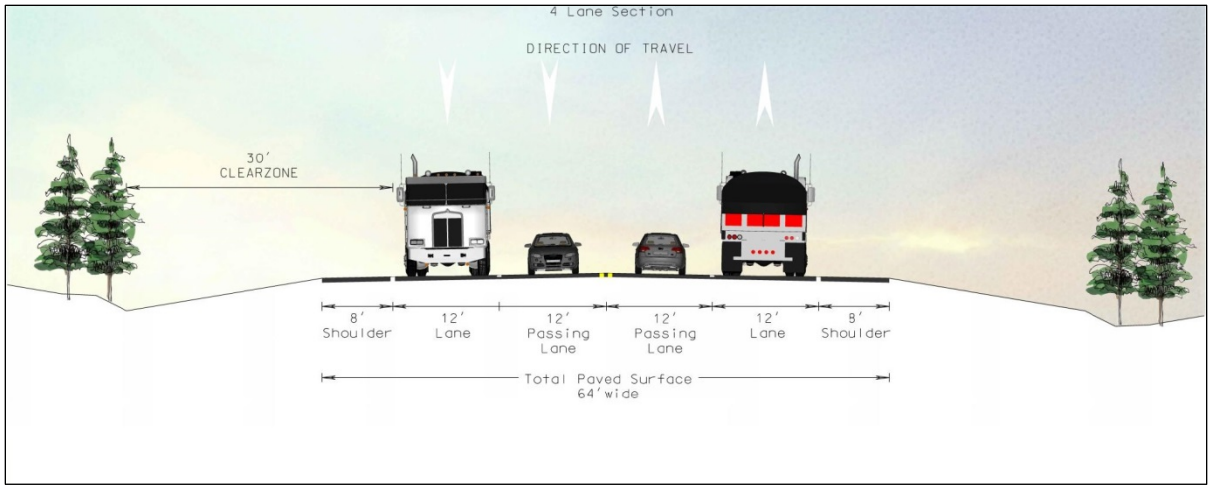

Figure 2.6-3. Four-lane cross section

The standard right-of-way for all alternatives would be 300 feet wide with slightly wider variations at large cut and/or fill areas.

The DOT&PF proposes to reserve roadway access rights, with all ingress/egress regulated, in areas where any build alternative is completely separate from the existing Sterling Highway (segment built on a new alignment). Controlling access means that access to the National highway System will only be allowed at selected public roads or by interchanges as shown on Right-of Way-Plans. DOT&PF would purchase land access rights where needed and plat and record the restrictions on access. No public roads or private driveways would be connected directly to the build alternatives in these segments. Pullouts or rest areas developed as part of the project would be the only driveways connected to these segments of the alternatives. Any existing roads would be grade separated (i.e., routed under or over the highway) where they crossed a segment built on a new alignment but would not be connected to the new highway via on- and off-ramps. Any new access (e.g., a driveway or approach road) would require a "driveway or approach road permit" that would comply with DOT&PF and FHWA design requirements and environmental evaluation procedures, including a requirement that access be provided via a bridge, and access to the alternative would be accomplished with on- and off-ramps rather than intersections.

The reservation by DOT&PF of roadway access rights is necessary to preserve the function of the new highway and to avoid adjacent development that could create similar conflict points on the realigned highway as are currently experienced on the existing highway through Cooper Landing. This level of access management prevents induced growth from compromising the functionality of the highway and more appropriately directs local access needs to the local road system. This approach is consistent with the approved DOT&PF *Strategic Highway Safety Plan* (DOT&PF 2012), Strategy HG.1: Preserving Alaska's Main Road Corridors. It is also consistent with the *Cooper Landing Land Use Classification Plan* (1996), which states "There is to be NO access to or from the new alignment other than the departure from the existing road at either end of the bypass. The NO ACCESS issue is not a matter taken lightly by the community" (emphasis in the original). The Kenai Peninsula Borough adopted the *Cooper Landing Land Use Classification Plan* in 2005.

The build alternatives are identical from MP 45 to MP 46.3, at the eastern end of the project, and from MP 55.8 to MP 60, at the western end of the project.

The preliminary designs for major project bridges included space for a pedestrian pathway on each bridge. There are no standards or criteria requiring such a pathway, but pathway space was included to account for potential need and worst-case cost estimates. Pathways currently are proposed only where they would tie into pedestrian trails. Otherwise, the wide highway shoulders would accommodate pedestrians and bicyclists. It is possible that, in final design, the extra space would be eliminated.

2.6.3 Cooper Creek Alternative

2.6.3.1 Overview

Under the Cooper Creek Alternative (Map 2.6-2), approximately 10 miles of the existing highway would be rebuilt to meet current standards and incorporate passing and turning lanes. The Cooper Creek Alternative would include a segment built on a new alignment, approximately 4 miles long. This segment would skirt a portion of Cooper Landing to the south. This alternative would replace two existing bridges over the Kenai River and also would provide a new bridge over Cooper Creek (see "Bridge" headings in Section 2.6.3.2 for details). This alternative would provide an underpass for Cooper Lake Dam Road.

2.6.3.2 Mile-by-Mile Detail

Segment built on the existing alignment (MP 44.5-47.9): The existing Sterling Highway would be widened and straightened to meet current rural principal arterial standards and would have the following features:

- MP 44.5–MP 45: This portion of the existing highway would be rebuilt to meet current standards.
- MP 45: Turning lanes would be provided on the Cooper Creek Alternative at its intersection with Quartz Creek Road.
- MP 45-46.5: A westbound passing lane would transition to an eastbound passing lane. A four-lane width would be provided at MP 46 where westbound and eastbound passing lanes both would occur.
- MP 46.5–MP 47.7: This portion of the existing highway would be rebuilt to meet current standards.
- MP 47.7: Turning lanes would be provided on the Cooper Creek Alternative at its intersection with Bean Creek Road.
- MP 47.8: The Cooper Landing Bridge would be replaced.
- MP 47.9: Turning lanes would be provided on the Cooper Creek Alternative at its intersection with "old" highway/Snug Harbor Road.

Segment built on a new alignment: A segment of highway would be built on a new alignment for about 4 miles.

At Snug Harbor Road (MP 47.9), the route would climb the hillside south of the existing highway for approximately 0.8 mile, with grades between 3 and 6 percent. The alternative would

reach a natural bench and traverse it for approximately 1.2 miles, reaching a maximum elevation of 716 feet, approximately 275 feet above the Kenai River. The alternative would include a westbound passing lane throughout the hill climb. The new road would be designed to pass over the existing Cooper Lake Dam Road in this area. The overpass would not include any off- or on-ramps or other connection between the two roads. Where the Cooper Creek Alternative crossed Cooper Lake Dam Road, the opening of the bridge or oversized culvert would be designed to accommodate dam construction and maintenance equipment. For about one-half mile in this area, the westbound passing lane and an eastbound passing lane both would occur, so the highway would have four lanes total (Map 2.6-2).

The alignment would descend at a 6 percent grade for 0.7 mile, crossing Cooper Creek on a curved bridge. This alternative would include an eastbound passing lane on this slope for 1.8 miles. The alternative then would traverse a short bench for one-third mile, and a pullout would be provided on the south side of the highway in this area, in part to serve as an informal new trailhead for the Stetson Creek Trail. The highway would descend the bluff at a 6 percent grade for one-third mile and level out, rejoining the existing alignment at MP 51.3. Turning lanes would be provided on the Cooper Creek Alternative at its intersection with the "old" highway.

Segment built on the existing alignment (MP 51.3–58.2): The existing Sterling Highway would be widened and straightened to meet current rural principal arterial standards.

- MP 51.3–MP 52.5: This portion of the existing highway would be rebuilt to meet current standards.
- MP 52.5: Turning lanes would be provided on the Cooper Creek Alternative at its intersection with the Russian River Campground access road/K'Beq Heritage Site access road.
- MP 52.5–MP 53: This portion of the existing highway would be rebuilt to meet current standards.
- MP 53: The Schooner Bend Bridge would be replaced.
- MP 53.1–MP 53.9: A westbound passing lane would be provided.
- MP 53.9–MP 54.3: An eastbound passing lane would be provided.
- MP 54.3–MP 54.9: This portion of the existing highway would be rebuilt to meet current standards.
- MP 54.9: Turning lanes would be provided on the Cooper Creek Alternative at its intersection with the Sportsman's Landing and Russian River Ferry access road.
- MP 54.9–MP 56.1: This portion of the existing highway would be rebuilt to meet current standards.
- MP 56.1–MP 57.1: A westbound passing lane would transition to an eastbound passing lane. Both westbound and eastbound passing lanes would occur near MP 56.5, resulting in a four-lane highway in this area (Map 2.6-2).
- MP 57.1–MP 58: This portion of the existing highway would be rebuilt to meet current standards.

- MP 58: Turning lanes would be provided on the Cooper Creek Alternative at its intersection with Skilak Lake Road.
- MP 58–MP 58.2: This portion of the existing highway would be rebuilt to meet current standards.

The "Old" Highway (MP 47.8–51.3). The segment of existing Sterling Highway (a total of approximately 3.5 miles) that is not incorporated into the Cooper Creek Alternative would not be altered as part of this alternative. As indicated at the beginning of Section 2.6, DOT&PF would continue to maintain this segment of "old" highway for access to Cooper Landing and to the Cooper Creek Campground. Costs of maintaining both the new and old highways are addressed under Cumulative Impacts (Section 3.27), and presented in Table 3.27-4.

Construction Sites. The alternative would require several construction staging areas and sites for disposal of woody debris and soils that would not be useable in construction (see Map 2.6-7); a 44-acre disposal site east of Cooper Creek would be the largest. Staging areas and temporary access roads beneath the Cooper Creek Bridge also would be necessary, as would relatively small staging areas adjacent to each new or replacement bridge. Use of these sites would be temporary, during construction only, but in some cases permanent effects could occur, as explained in Chapter 3.

Cooper Landing Bridge Replacement. The Cooper Landing Bridge would be replaced on an alignment slightly upstream (east) of the existing bridge to match a realigned curve to the north and to allow for use of the existing bridge (or of a temporary bridge) during construction. Any part of the existing bridge not used in the new bridge would be removed. A retaining wall, instead of fill placement, would likely be used on the north side of the Kenai River. The bridge length would be approximately 670 feet. The total bridge width would be 78 feet. The proposed bridge would include two 12-foot lanes; a 12-foot westbound right-turn lane; a 16-foot center turn lane; 8-foot shoulders; and a 6-foot separated pathway on the north (downstream) side of the bridge (see Figure 2.6-4).

Figure 2.6-5 is a rendering of a new Cooper Landing Bridge from the perspective of the ramp at the Cooper Landing Boat Launch. Preliminary bridge design indicates that three or four piers will be required for this bridge (depending on the bridge type).

New Cooper Creek Bridge. The proposed Cooper Creek Bridge would be sited approximately one-half mile upstream of the existing Cooper Creek Bridge, and would cross over Cooper Creek in a curve at 6 percent grade. The total bridge length would be approximately 840 feet. The width of 62 feet would accommodate two 12-foot lanes, a 12-foot eastbound passing lane, 8-foot shoulders, and a future 6-foot pathway on one side (Figure 2.6-6). See the pathway discussion at the end of Section 2.6.2. Preliminary bridge design indicates that four to six piers would be required for this bridge.

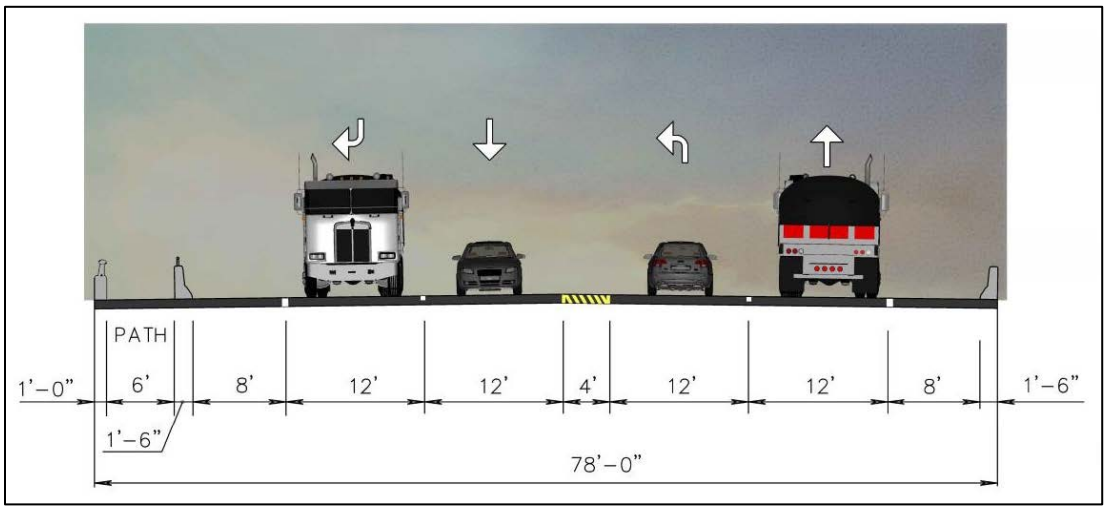

Figure 2.6-4. Cooper Landing Bridge cross section

Figure 2.6-5. Visual simulation of Cooper Landing Bridge reconstruction

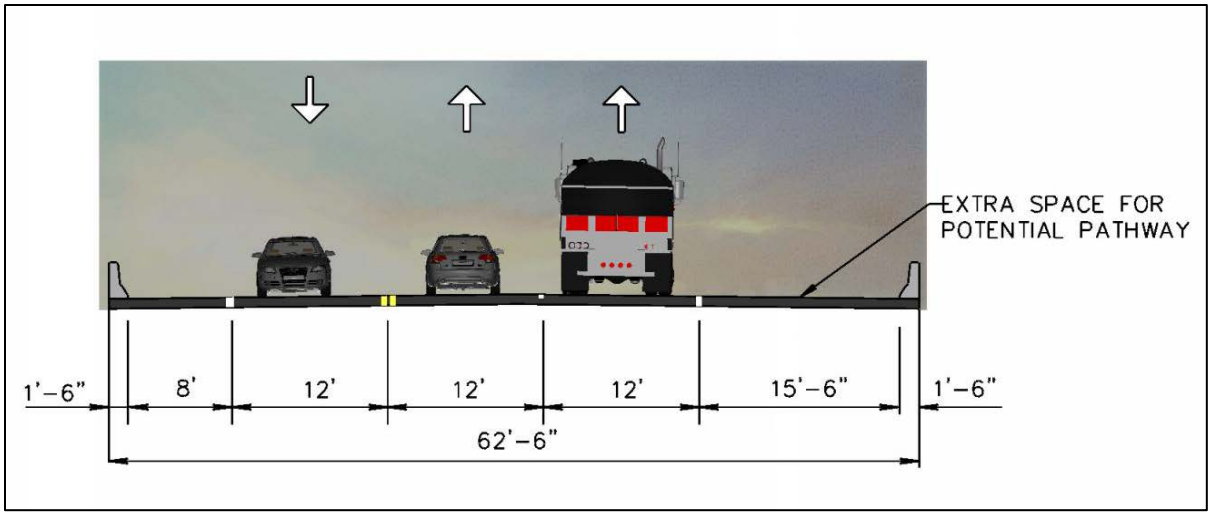

Figure 2.6-6. Cooper Creek Bridge cross section

Schooner Bend Bridge Replacement. The Schooner Bend Bridge would be replaced approximately 80 feet downstream from the existing bridge, which would allow for better road geometry, avoid an eroding bend in the Kenai River, and allow the old bridge to accommodate traffic during construction. The old bridge would be entirely removed once the new bridge was in operation. The proposed bridge would be approximately 325 feet long and 50 feet wide to include two 12-foot lanes, 8-foot shoulders, and space for a future 6-foot pathway on one side (see Figure 2.6-7). See the pathway discussion at the end of Section 2.6.2. Preliminary bridge design indicates that one to two piers would be required for this bridge.

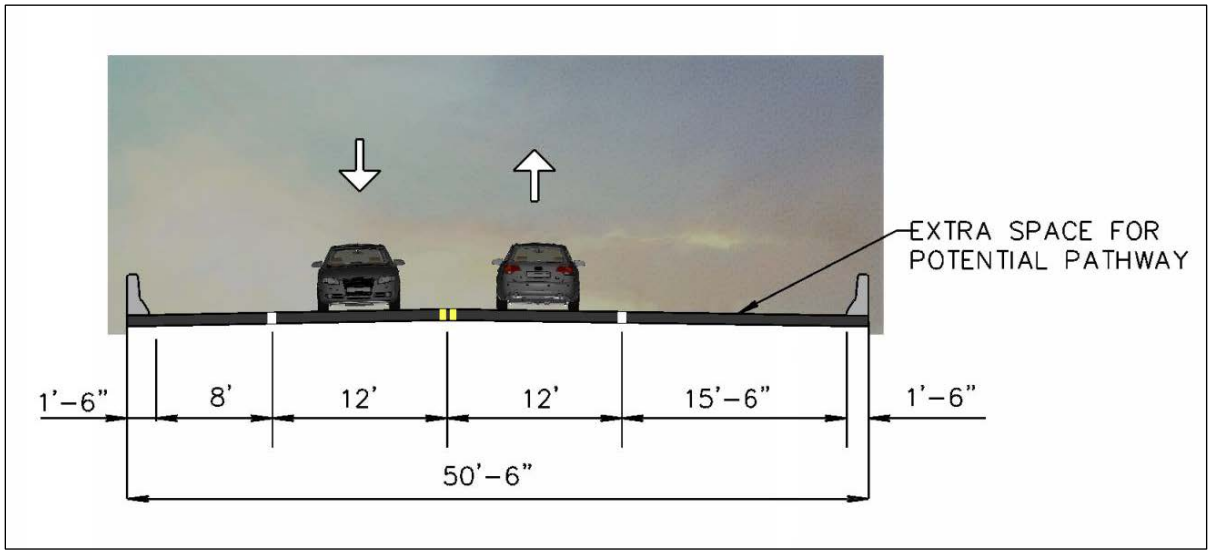

Figure 2.6-7. Schooner Bend Bridge cross section

2.6.4 G South Alternative

2.6.4.1 Overview

Under the G South Alternative (Map 2.6-3), approximately 8 miles of the existing Sterling Highway would be improved on the existing alignment to meet current standards and to incorporate passing and turning lanes. The G South Alternative would include a segment approximately 5.5 miles long built on a new alignment. This segment would skirt Cooper Landing to the north. One existing bridge over the Kenai River would be replaced, a separate new bridge over the Kenai River would be constructed, and a new bridge over Juneau Creek would be constructed (see "Bridge" headings in Section 2.6.4.2 for details). This alternative would create an underpass for the existing Slaughter Ridge Road (USFS logging road and route of the Bean Creek Trail) near a crossing of Bean Creek, without any connection between the two roads.

2.6.4.2 Mile-by-Mile Detail

Segment built on the existing alignment (MP 44.5–46.3)*:* The existing Sterling Highway would be widened and straightened to meet current rural principal arterial standards.

- MP 44.5–MP 45: This portion of the existing highway would be rebuilt to meet current standards.
- MP 45: Turning lanes would be provided on the G South Alternative at its intersection with Quartz Creek Road.
- MP 45–MP 46: A westbound passing lane would be provided.
- MP 46–MP 46.3: This portion of the existing highway would be rebuilt to meet current standards.
- MP 46.3: Turning lanes would be provided on the G South Alternative at its intersection with the "old" highway.

Segment built on a new alignment: A segment of highway would be built on a new alignment for about 5.5 miles.

The G South Alternative would depart from the existing highway alignment at MP 46.3 and climb the hillside well east of Bean Creek at 5.2 percent grade for 1.25 miles to a maximum elevation of 776 feet. A westbound passing lane would be provided as the alignment climbed the hill (see Map 2.6-3). The alternative would traverse a natural bench for approximately 2.4 miles.

The alternative then would descend to cross the extension of Slaughter Ridge Road/Bean Creek Trail and Bean Creek. The trail/USFS road would be rerouted slightly and placed in an underpass under the new highway, with no direct connection between the highway and the old logging road. The underpass would provide for passage by logging trucks. A summer trailhead parking area slightly separated from the highway and a pullout along the highway both would be constructed for Bean Creek Trail, both located west of Bean Creek and north of the new highway.

The alternative would descend at a 5.9 percent grade to cross Juneau Creek (lower canyon area) on a large new bridge. An eastbound passing lane 2.2 miles long would occur on this hill (Map 2.6-3). The alternative then would cross the Kenai River on a proposed new bridge and rejoin the

existing highway corridor at existing MP 51.9. Passing lanes would be provided on the G South Alternative at its intersection with the "old" highway. The intersection would occur near MP 51.4.

Segment built on the existing alignment (MP 51.9–58.2): The existing Sterling Highway would be widened and straightened to meet current rural principal arterial standards. The G South Alternative in this segment would be identical to the Cooper Creek Alternative (see Section 2.6.3.2).

- MP 51.9–MP 52.5: This portion of the existing highway would be rebuilt to meet current standards.
- MP 52.5: Turning lanes would be provided on the G South Alternative at its intersection with the Russian River Campground access road/K'Beq Heritage Site access road.
- MP 52.5–MP 53: This portion of the existing highway would be rebuilt to meet current standards.
- MP 53: The Schooner Bend Bridge would be replaced.
- MP 53.1–53.9: A westbound passing lane would be provided.
- MP 53.9–54.3: An eastbound passing lane would be provided.
- MP 54.3–MP 54.9: This portion of the existing highway would be rebuilt to meet current standards.
- MP 54.9: Turning lanes would be provided on the G South Alternative at its intersection with the Sportsman's Landing and Russian River Ferry access road.
- MP 54.9–MP 56.1: This portion of the existing highway would be rebuilt to meet current standards.
- MP 56.1–MP 57.1: A westbound passing lane would transition to an eastbound passing lane. Both westbound and eastbound passing lanes would occur near MP 56.5, resulting in a four-lane highway in this area (Map 2.6-3).
- MP 57.2–MP 58: This portion of the existing highway would be rebuilt to meet current standards.
- MP 58: Turning lanes would be provided on the G South Alternative at its intersection with Skilak Lake Road.
- MP 58–MP 58.2: This portion of the existing highway would be rebuilt to meet current standards.

The "Old" Highway (MP 46.3–51.9). The segment of existing highway, approximately 5.6 miles long, not incorporated into the G South Alternative would not be altered as part of this project. As indicated at the beginning of Section 2.6, DOT&PF would continue to maintain this segment of "old" highway for access to Cooper Landing and Cooper Creek Campground. Costs of maintaining both the new and old highways are addressed under Cumulative Impacts (Section 3.27), and presented in Table 3.27-4.

Construction Sites. The alternative would require several construction staging areas and sites for disposal of woody debris and soils that would not be useable in construction (see Map 2.6-7).

A 35-acre area west of Juneau Creek would be the largest site needed for this alternative, combining a bridge construction staging and disposal area, and including an access road. A 27-acre disposal area is proposed east of Juneau Creek, as well as relatively small staging areas adjacent to each new or replacement bridge. Use of these sites would be temporary and occur during construction only, but in some cases permanent effects could occur, as explained in Chapter 3.

New G South Juneau Creek Bridge. The Juneau Creek Bridge would be about 1,300 feet long and 62 feet wide. The bridge would have two 12-foot lanes, a 12-foot eastbound passing lane, 8-foot shoulders, and enough width to accommodate a future 6-foot pathway on one side (identical to the Cooper Creek Bridge; see Figure 2.6-6, above). No pathway on the bridge is proposed at this time. This crossing would be constructed where the canyon begins to open into the Kenai River Valley. At its highest point, the bridge would be approximately 200 feet above the canyon floor. Preliminary bridge design indicates that three to eight piers would be required for this bridge.

New Kenai River Bridge. The proposed new Kenai River Bridge would be about 500 feet long and 78 feet wide. It would have two 12-foot lanes, a 12-foot eastbound passing lane, a 16-foot center turn lane, 8-foot shoulders, and enough width to accommodate a future 6-foot pathway on one side (see Figure 2.6-8). See the pathway discussion at the end of Section 2.6.2. Preliminary bridge design indicates that two to three piers would be required for this bridge (depending on the bridge type).

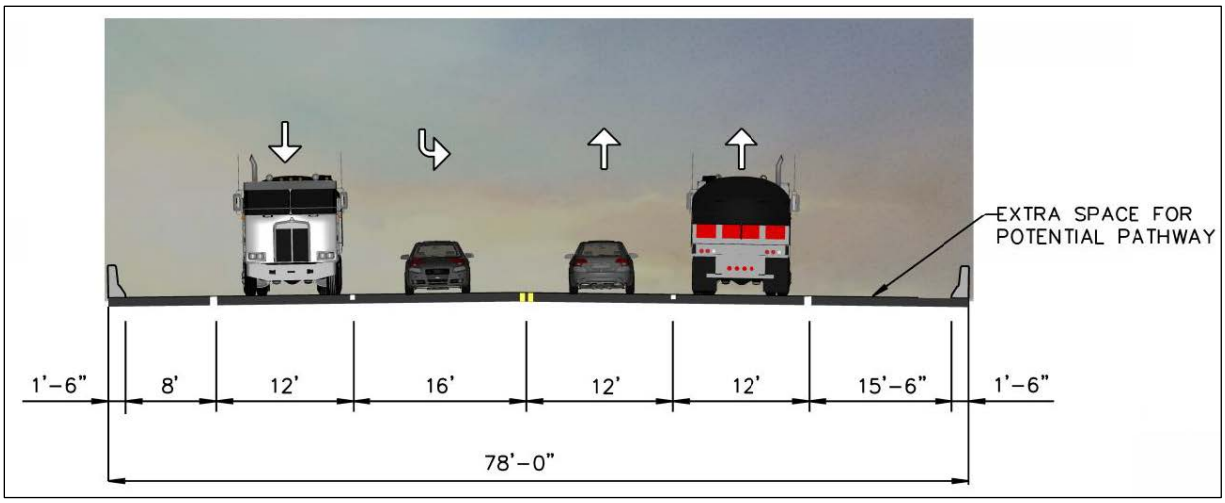

Figure 2.6-8. G South Alternative, new Kenai River Bridge cross section

Schooner Bend Bridge Replacement. The Schooner Bend Bridge would be replaced approximately 80 feet downstream from the existing bridge. Relocating the bridge would allow for better road geometry, avoid an eroding bend in the Kenai River, and allow the old bridge to accommodate traffic during construction. The old bridge would be entirely removed once the new bridge was in operation. The proposed bridge would be approximately 325 feet long and 50 feet wide and would include two 12-foot lanes, 8-foot shoulders, and enough width to accommodate a future 6-foot pathway on one side (see Figure 2.6-7, above). No pathway on the

bridge is proposed at this time. Preliminary bridge design indicates that one to two piers would be required for this bridge.

2.6.5 Juneau Creek Alternative

2.6.5.1 Overview

The Juneau Creek Alternative and Juneau Creek Variant Alternative (see Section 2.6.6) are similar. Map 2.6-4 and Map 2.6-5 illustrate these alternatives. The major difference between the two alternatives is that the Juneau Creek Alternative was created on the best alignment for engineering and traffic purposes, but crossed the Mystery Creek Wilderness in the KNWR. The Juneau Creek Variant Alternative was developed to avoid KNWR Wilderness (see "Status of Juneau Creek Alternative" box).

Status of Juneau Creek Alternative in this SEIS

The Juneau Creek Alternative would cross Federally designated Wilderness lands within the KNWR. FHWA and DOT&PF consider these impacts unacceptable and the required process for authorizing a road across Wilderness an unacceptable risk to the project, given that other reasonable alternatives exist that don't have these issues. DOT&PF and FHWA have announced to cooperating agencies that they are unlikely to select the Juneau Creek Alternative as the preferred alternative, but they are fully evaluating it in this EIS. No final decision will be made until the Record of Decision is signed. See full explanation in Section 2.4.2.2, above.

The Juneau Creek Alternative (Map 2.6-4) would include a segment built on a new alignment approximately 9.5 miles long. This segment would skirt Cooper Landing to the north. Under the Juneau Creek Alternative, approximately 4 miles of the existing highway would be improved on the existing alignment to meet current standards and incorporate passing and turning lanes. This alternative would not replace any existing bridges but would construct one new bridge over Juneau Creek (see "Bridge" heading in Section 2.6.5.2 for details). This alternative would create underpasses or overpasses for USFS logging roads west of Juneau Creek, with no connection between the highway and the road at each crossing.

2.6.5.2 Mile-by-Mile Detail

Segment built on the existing alignment (MP 44.5–46.3): The existing Sterling Highway would be widened and straightened to meet current rural principal arterial standards.

- MP 44.5–MP 45: This portion of the existing highway would be rebuilt to meet current standards.
- MP 45: Turning lanes would be provided on the Juneau Creek Alternative at its intersection with Quartz Creek Road.
- MP 45–46.3: A westbound passing lane would be provided.
- MP 46.3: Turning lanes would be provided on the Juneau Creek Alternative at its intersection with the "old" highway.

Segment built on a new alignment: A new segment of highway would be built on a new alignment for about 10 miles.

The Juneau Creek Alternative would diverge from the existing highway alignment at MP 46.3 and climb the hillside to the west for approximately 1.2 miles at a 5 percent grade. A westbound passing lane would be provided in this area. The alternative would level out for another 1.2 miles and then climb 2 miles at a 4.3 percent grade, and a westbound passing lane would be provided.

The grade would be reduced as the alternative crossed the Juneau Creek canyon with a large new bridge. Immediately east of the bridge, a pullout would be constructed north of the highway. Immediately west of the bridge, a large trailhead parking area would be constructed for the Resurrection Pass Trail. West of the canyon, the alternative would continue to climb to its maximum elevation of 1,150 feet, and the westbound passing lane would continue.

The alternative would then descend the hillside over 3.3 miles, enter a 0.8-mile-long segment with nearly 6 percent downgrade, and then flatten out and rejoin the existing highway corridor near MP 55.8. An eastbound passing lane would occur throughout this section. An overpass or underpass would be provided for Chunkwood Road, a USFS road located approximately 1 mile west of Juneau Creek, and for West Juneau Road, another former USFS logging road located approximately 2.5 miles west of Juneau Creek. No connection between the highway and these roads would be provided. The underpass/overpass designs would accommodate logging trucks.

At MP 55.8, the "old" highway would be rerouted to loop south of its current location for a short distance to form a T-intersection with the new alignment. Turning lanes would be provided on the Juneau Creek Alternative at its intersection with the "old" highway.

Segment built on the existing alignment (MP 55.8–MP 58.2): The existing Sterling Highway would be widened and straightened to meet current rural principal arterial standards. All alternatives in this segment would be identical.

- MP 55.8–MP 56.1: This portion of the existing highway would be rebuilt to meet current standards.
- MP 56.1–MP 57.1: A westbound passing lane would transition to an eastbound passing lane. Both westbound and eastbound passing lanes would occur near MP 56.5, resulting in a four-lane highway in this area (Map 2.6-4).
- MP 57.1–MP 58: This portion of the existing highway would be rebuilt to meet current standards.
- MP 58: Turning lanes would be provided on the Juneau Creek Alternative at its intersection with Skilak Lake Road.
- MP 58–MP 58.2: This portion of the existing highway would be rebuilt to meet current standards.

The "Old" Highway (MP 46.3–MP 55.8). The segment of existing highway (approximately 9.5 miles) that is not incorporated into the Juneau Creek Alternative would not be altered as part of this project. As indicated at the beginning of Section 2.6, DOT&PF would continue to maintain this segment of "old" highway for access to Cooper Landing and to recreational amenities along the Kenai River. Costs of maintaining both the new and old highways are addressed under Cumulative Impacts (Section 3.27), and presented in Table 3.27-4.

Construction Sites. The alternative would require several construction staging areas and sites for disposal of woody debris and soils that would not be useable in construction (see Map 2.6-7). A 27-acre disposal area east of Juneau Creek with a 4-acre access road would be the largest construction site needed for this alternative. A 20-acre disposal area is proposed well west of Juneau Creek, as well as relatively small staging areas adjacent to the new Juneau Creek Bridge. Use of these sites would be temporary and during construction only, but in some cases permanent changes could occur, as explained in Chapter 3.

New Juneau Creek Bridge. The proposed new bridge would be 62 feet wide with two 12-foot traffic lanes, one 12-foot westbound passing lane, 8-foot shoulders, and a 6-foot pathway on the south side of the bridge (see Figure 2.6-9). The bridge length would be approximately 1,200 feet with a main span of 825 feet. [7]

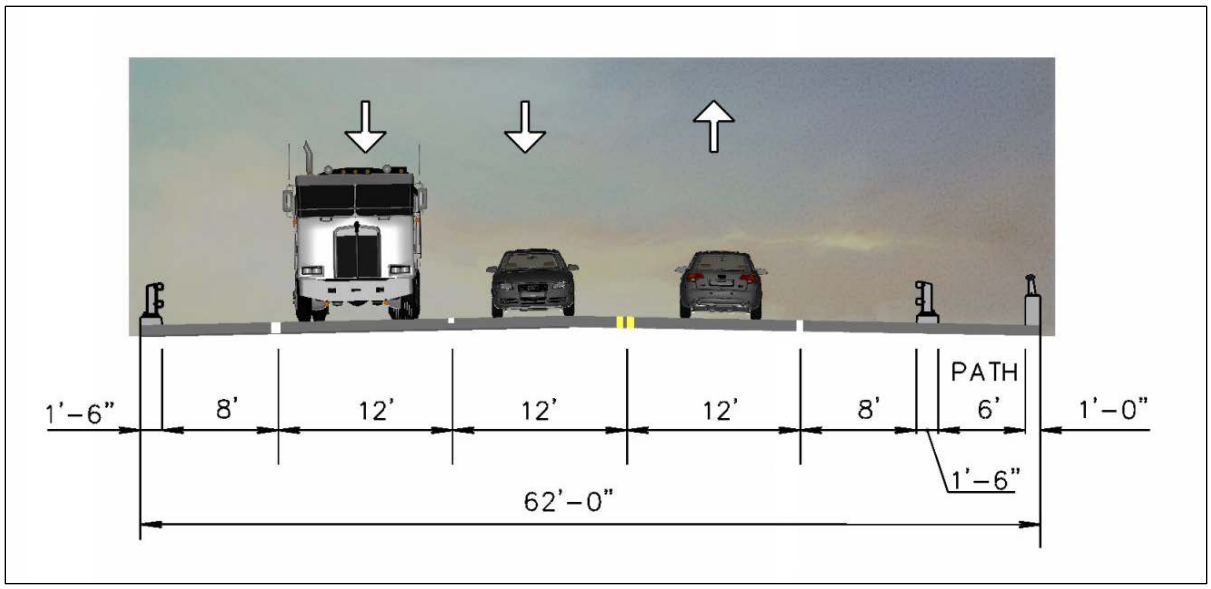

Figure 2.6-9. Juneau Creek Bridge cross section

Several options were considered for the longer 825-foot main span (space between bridge pier supports). If constructed, this would be the longest span in Alaska, though still within the realm of standard bridge design and construction. Figure 2.6-10 is a visual simulation of one type of bridge being considered for the crossing of Juneau Creek canyon, and Figure 2.6-11 shows the different bridge options that have been evaluated (HDR 2011c) for this SEIS.

[7] The conceptual alignment and profile for this crossing location identify the bridge as approximately 230 feet above the creek. The rim-to-rim width of the canyon at the crossing location is approximately 425 feet. Preliminary geotechnical investigation revealed large cracks running parallel to the canyon up to 100 feet from the rim on both sides. The instability caused by the cracks creates the potential for a large slide of the soil and rock from the cracks area to Juneau Creek; therefore, it was recommended that the ends of the bridges be located no closer to the canyon rim than 200 feet. This setback value of 200 feet from the canyon rim is preliminary, based on available geotechnical information. This setback would be validated during project design to ensure that bridge supports were located in solid founding materials. Piers could be located on the canyon rims if geotechnical investigation indicated adequate foundation material. In either case, the bridge main span or approach span would allow for users of the Resurrection Pass Trail, located on the west side of the Juneau Creek Canyon, to pass under the bridge without relocating the existing trail. Users of the relocated Bean Creek Trail, located on the east side of the Juneau Creek Canyon, would also be able to pass under the bridge on the east side of the bridge crossing. Further discussion appears in Chapter 4 under Measures to Minimize Harm.

Figure 2.6-10. Juneau Creek Bridge visual simulation

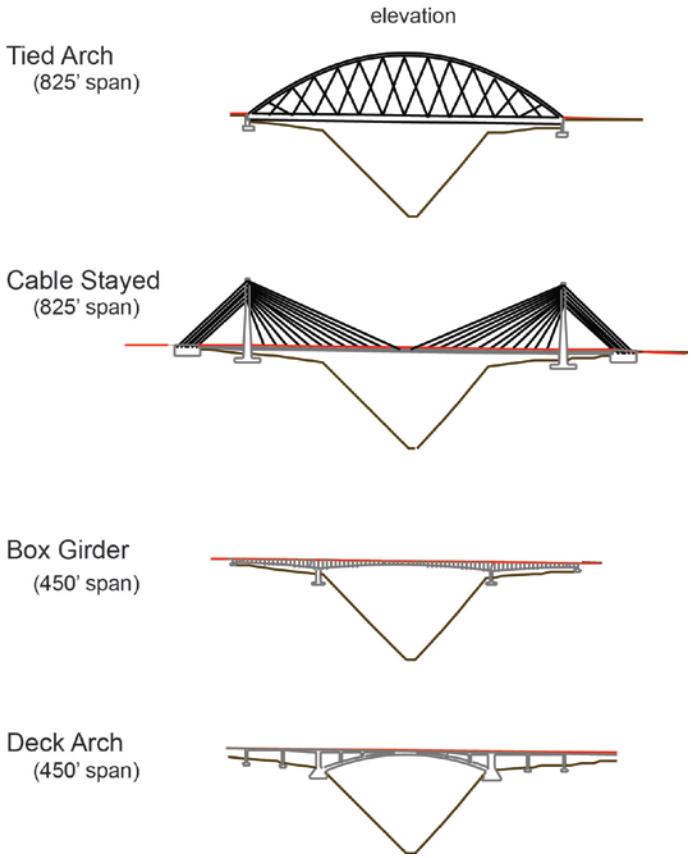

Figure 2.6-11. Juneau Creek Bridge types under consideration, with length of main span indicated.

Box girder and deck arch bridge types include an approach span at either end of the main span.

Preliminary bridge design indicates abutments and piers would not be required in the canyon. For purposes of this document, the top (rim) of the canyon is defined as elevation 1,060 feet. DOT&PF has made a commitment that no structure or work would occur in the Juneau Creek canyon below elevation 1,060 feet in this area.

The most efficient bridge options would be a large arch tied by steel or cable to the road deck below (tied arch); and a road deck supported by cable stays hung from towers, one at each end of the bridge (cable stayed; see Figure 2.6-11). Two additional options were considered that would be designed for a shorter main span that might be founded near the rims of the canyon. These options would result in a 450-foot main span with approach spans that would tie into the bridge abutments. Bridge options under consideration for the shorter main 450-foot span include a box girder and a deck arch, also illustrated in Figure 2.6-11.

2.6.6 Juneau Creek Variant Alternative

2.6.6.1 Overview

The Juneau Creek Variant Alternative (Map 2.6-5) would construct a segment approximately 8.8 miles long on a new alignment. This segment built on a new alignment would skirt Cooper Landing to the north. Approximately 5 miles of the existing road would be improved on the existing alignment to meet current standards and incorporate passing and turning lanes. This alternative would not replace any existing bridges and would construct one new bridge over Juneau Creek. This alternative would construct underpasses or overpasses for two crossings of USFS logging roads west of Juneau Creek. At the western end of the "old" highway near Sportsman's Landing, this alternative would bridge over the "old" highway in order to create an intersection on the north side of the new highway.

2.6.6.2 Mile-by-Mile Detail

Segment built on the existing alignment (MP 44.5–46.3): The existing Sterling Highway would be widened and straightened to meet current rural principal arterial standards. The Juneau Creek Variant Alternative would be identical to the Juneau Creek Alternative (see Section 2.6.5.2) in this area.

Segment built on a new alignment: A new segment of highway would be built on a new alignment for about 8.8 miles.

The Juneau Creek Variant Alternative would climb to a crossing of Juneau Creek and to its high point and would be identical to the Juneau Creek Alternative (see Section 2.6.5.2) in this area. The difference between the alternatives would occur in a segment 3.2 miles long in the area west of Juneau Creek and east of Sportsman's Landing. Beginning at a point approximately 1.5 miles west of the Juneau Creek Bridge, the Variant would diverge from the Juneau Creek Alternative and follow a slightly more sinuous and, on average, slightly steeper alignment to rejoin the existing alignment at MP 55 of the existing highway. The grades would reach 5.8 percent but would not exceed the 6 percent standard for a rural principal arterial. An eastbound passing lane would occur throughout this section. An overpass or underpass would be provided for Chunkwood Road, a USFS road located approximately 1 mile west of Juneau Creek, and for West Juneau Road, another former USFS logging road located approximately 2.5 miles west of Juneau Creek. No connections between the highway and these roads would be provided. The underpass/overpass designs would accommodate logging trucks.

The new highway would cross another overpass at the base of the descent, and the "old" highway near MP 54.9 would be rerouted under this bridge to form a T-intersection on the north side of the new highway, as illustrated on Map 2.6-6 and in a visual simulation in Figure 2.6-12. The highway at the base of this descent would be four lanes wide, with a combination of turning lanes, acceleration lanes, and an eastbound passing lane. Access to Sportsman's Landing would occur off the "old" highway and would be slightly reconfigured as part of the re-routing of the western end of the "old" highway. The Juneau Creek Variant Alternative would be within the existing highway right-of-way at the KNWR boundary, and this alternative would avoid the need for acquiring lands from the KNWR designated Wilderness. This is the key difference between this alternative and the Juneau Creek Alternative (see Section 2.6.5.2).

Segment built on the existing alignment (MP 55–58.2): The existing Sterling Highway would be widened and straightened to meet current rural principal arterial standards. The Juneau Creek Variant Alternative throughout this segment would be identical to the Cooper Creek and G South alternatives (see Sections 2.6.3.2 and 2.6.4.2).

- MP 55–MP 56.1: This portion of the existing highway would be rebuilt to meet current standards.
- MP 56.1–MP 57.1: A westbound passing lane would transition to an eastbound passing lane. Both westbound and eastbound passing lanes would occur near MP 56.5, resulting in a four-lane highway in this area (Map 2.6-5).
- MP 57.1–MP 58: This portion of the existing highway would be rebuilt to current standards.
- MP 58: Turning lanes would be provided on the Juneau Creek Variant Alternative at its intersection with Skilak Lake Road.
- MP 58–MP 58.2: This portion of the existing highway would be rebuilt to meet current standards.

Figure 2.6-12. Sportsman's Landing underpass visual simulation

Car heading west from Sportsman's Landing, passing under the Juneau Creek Variant Alternative. The visualization provides an approximate depiction of the bridge/underpass scenario expected for the crossing. The nature of the final structure will be refined through the design process.

The "Old" Highway (MP 46.3–55.0): The remaining segment of the existing highway (approximately 8.7 miles) that is not incorporated into the Juneau Creek Variant Alternative would not be altered as part of this alternative, except at Sportsman's Landing on its very western end where it ties into the Juneau Creek Variant alternative. As indicated at the beginning of Section 2.5, DOT&PF would continue to maintain the "old" highway for access to Cooper Landing and to recreational amenities along the Kenai River. Costs of maintaining both the new and old highways are addressed under Cumulative Impacts (Section 3.27), and presented in Table 3.27-4.

Construction Sites. The alternative would require several construction staging areas and sites for disposal of woody debris and soils that would not be useable in construction. These would be the same as discussed above for the Juneau Creek Alternative (Section 2.6.5.2) and shown on Map 2.6-7.

Juneau Creek Bridge. The proposed new Juneau Creek Bridge would be the same as the bridge described under the Juneau Creek Alternative (see Section 2.6.5.2; Figure 2.6-9 and Figure 2.6-10, above).

Sportsman's Landing Connection. A half-loop arc of road would connect the "Old Sterling Highway" to the Juneau Creek Variant Alternative, and a 140-foot bridge would route the new

highway over the rerouted end of the "old" highway (see Map 2.6-6 and photo simulation in Figure 2.6-12). On the bridge, the Juneau Creek Variant Alternative would be 64 feet wide, with two 12-foot lanes, a 12-foot eastbound passing lane, a 12-foot westbound turning lane, and 8-foot shoulders. The existing highway would be rerouted to pass under this bridge and would be 40 feet wide and consist of two lanes with 8-foot shoulders.

2.7 Comparison of Alternatives and Process for Identifying a Preferred Alternative

A side-by-side comparison of quantifiable benefits and adverse impacts of the alternatives has been compiled in tabular format. Rather than repeat that voluminous information in two places, that summary table appears solely in the Executive Summary. Comparative analysis also appears at the end of Chapter 4, the Section 4(f) Evaluation. Such comparisons are key in the selection of a preferred alternative.

At this time, neither DOT&PF nor FHWA has identified a preferred alternative. The agencies expect to identify a preferred alternative in the Final EIS. DOT&PF and FHWA will identify a preferred alternative after they have fully considered and responded to comments on the Draft SEIS and comments made in a public hearing.

FHWA will make its final decision by selecting an alternative no sooner than 30 days after the Notice of Availability for the Final EIS is published in the *Federal Register*. The decision will be published in a Record of Decision.

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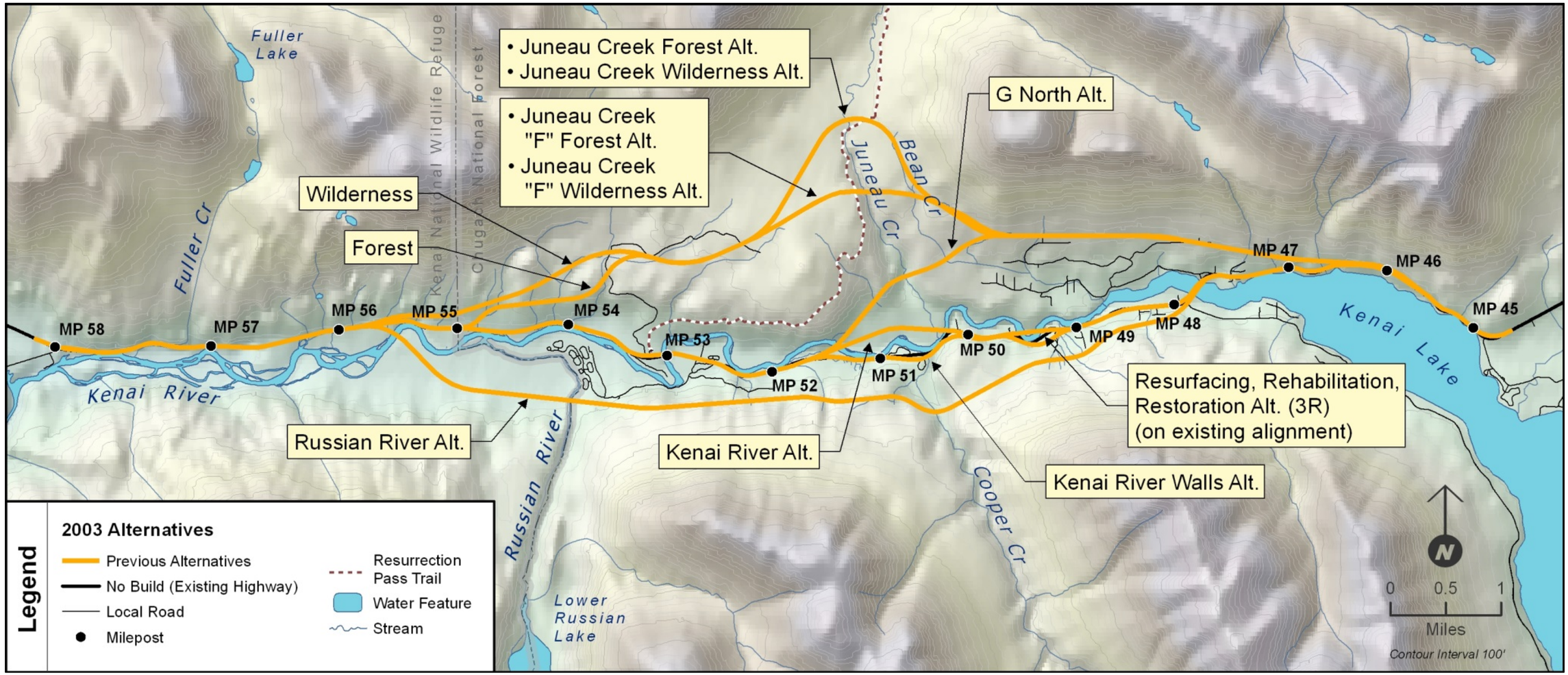

Map 2.3-1. 2003 alternatives considered but rejected

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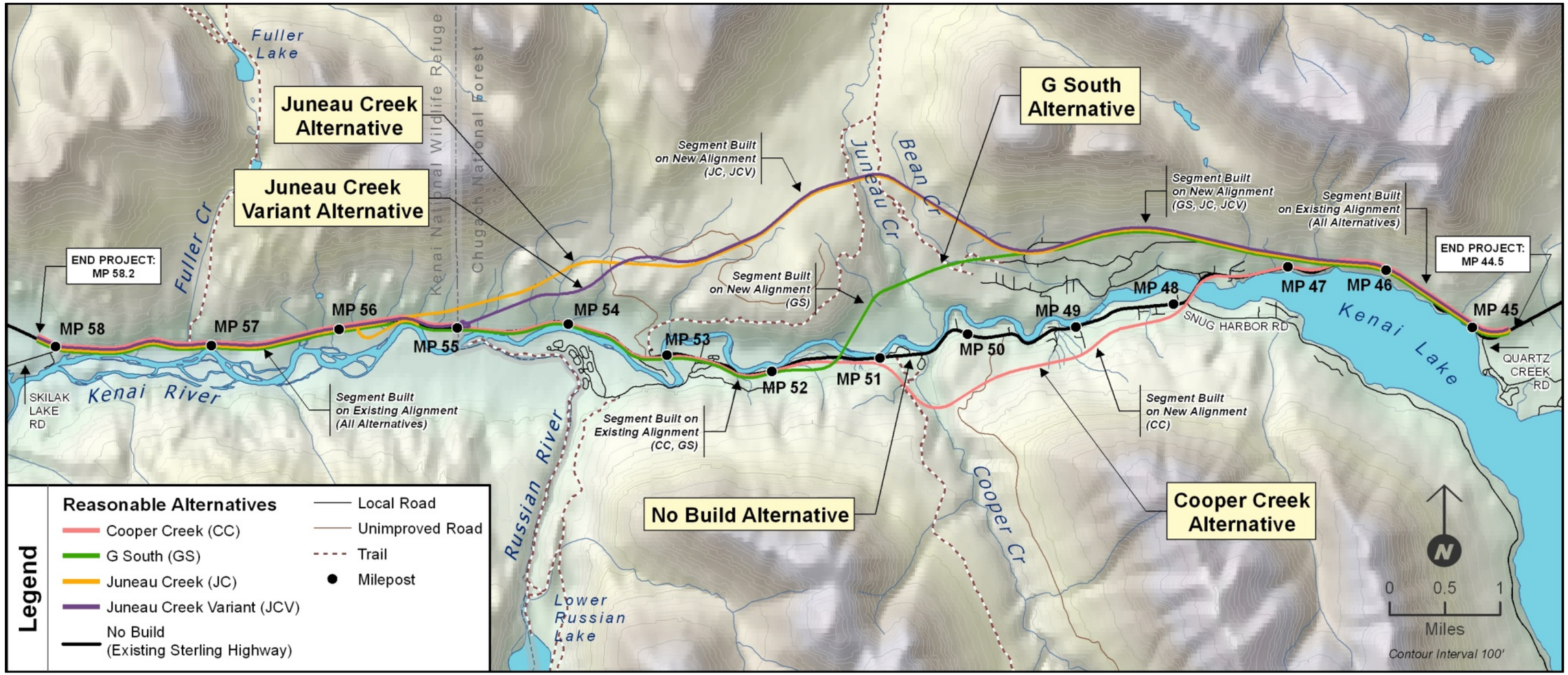

Map 2.4-1. Reasonable alternatives

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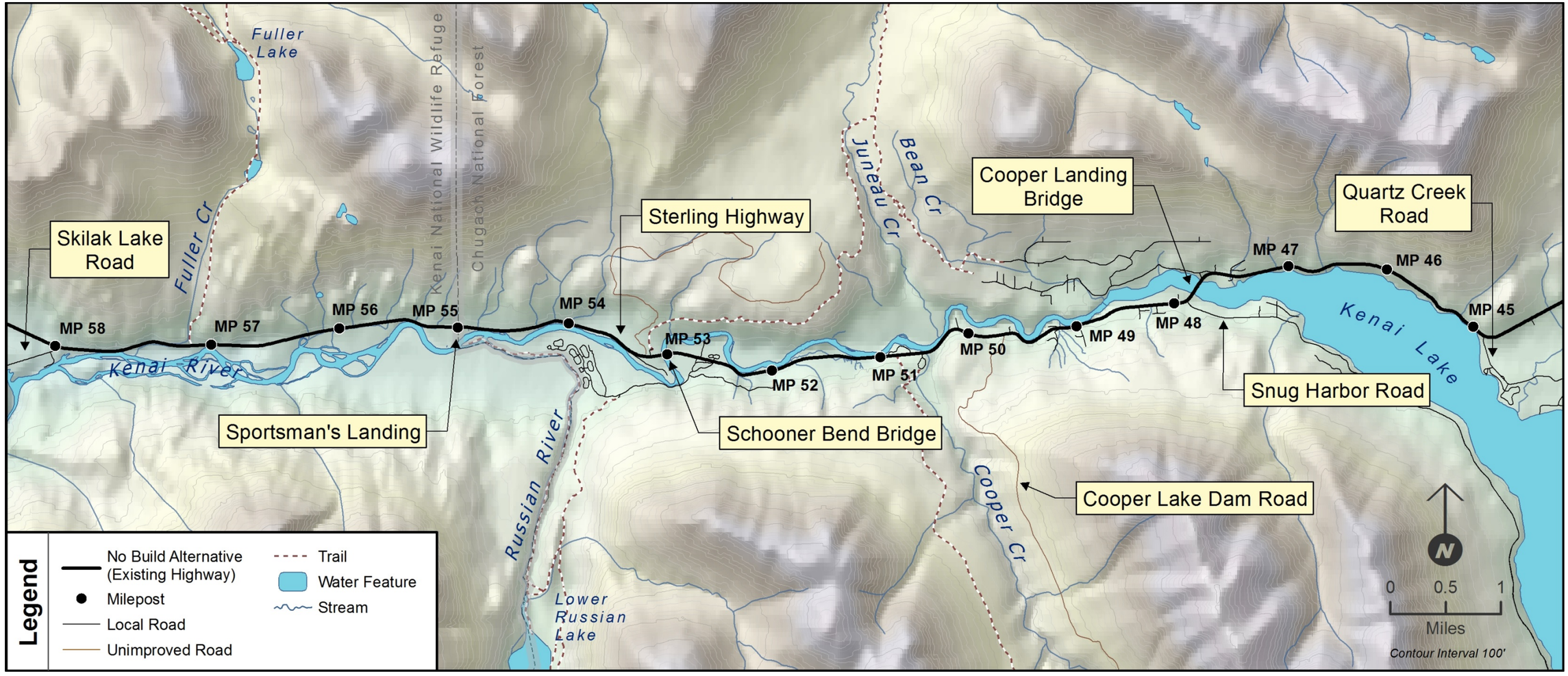

Map 2.6-1. No Build Alternative

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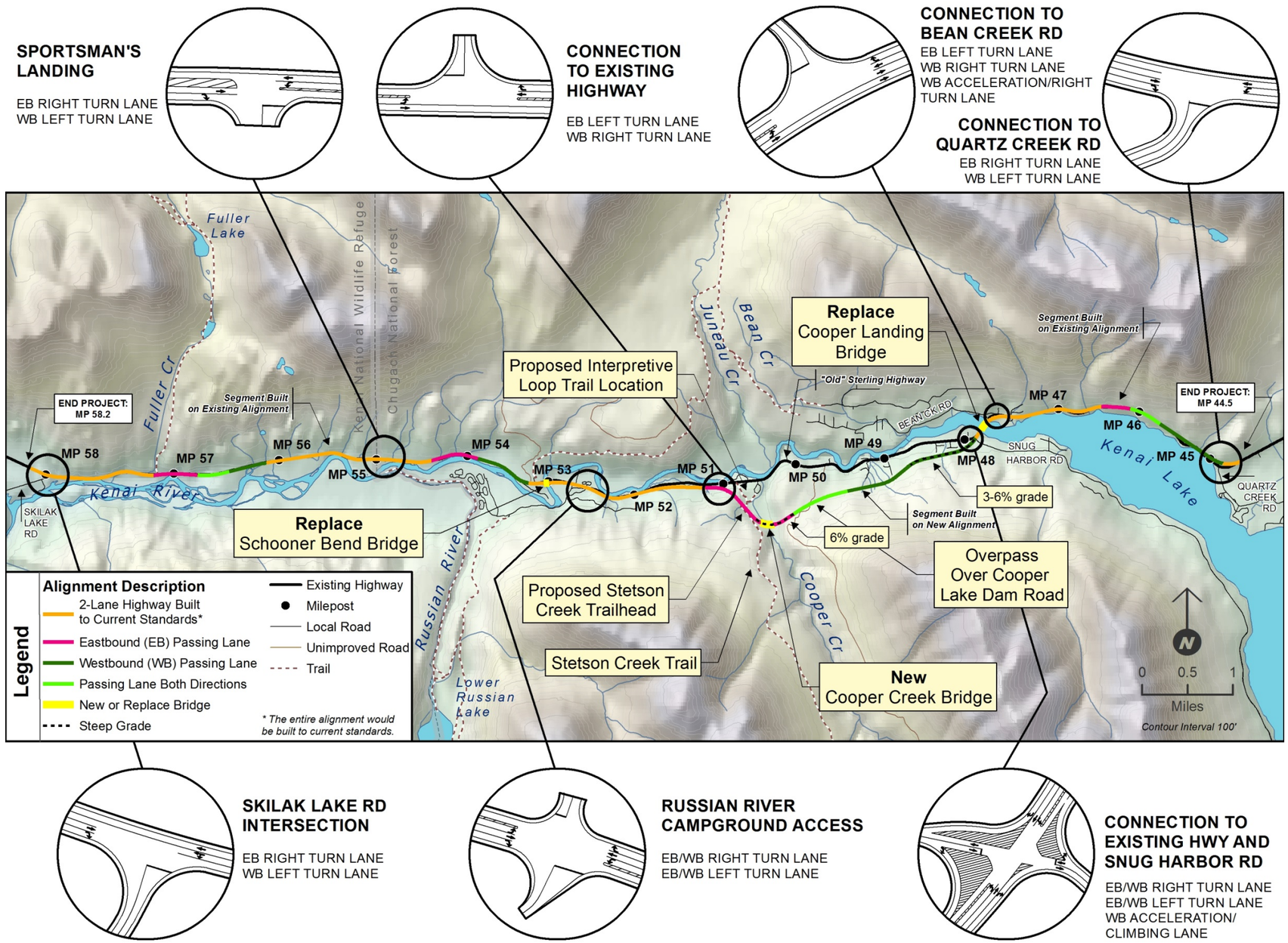

Map 2.6-2. Cooper Creek Alternative

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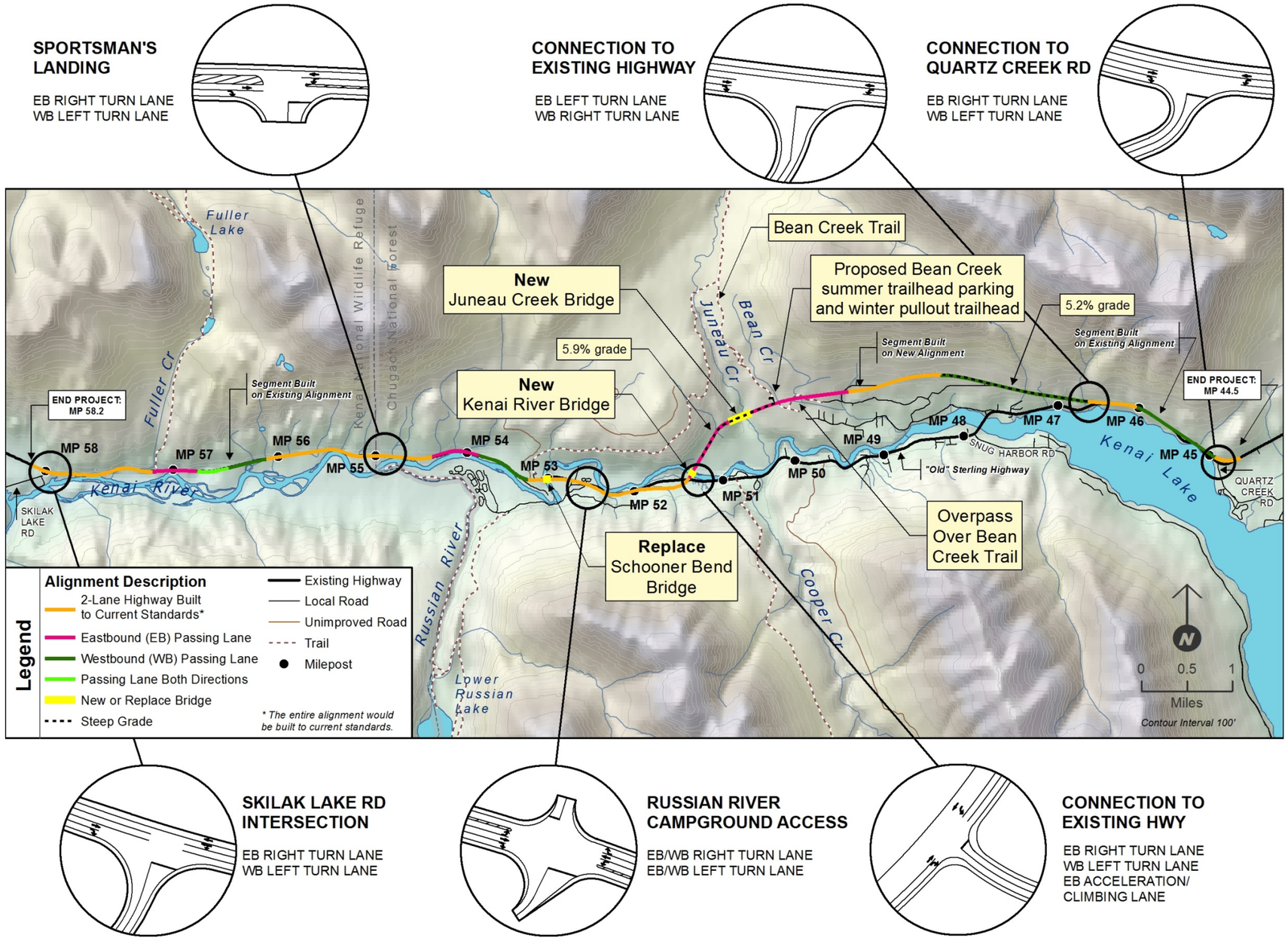

Map 2.6-3. G South Alternative

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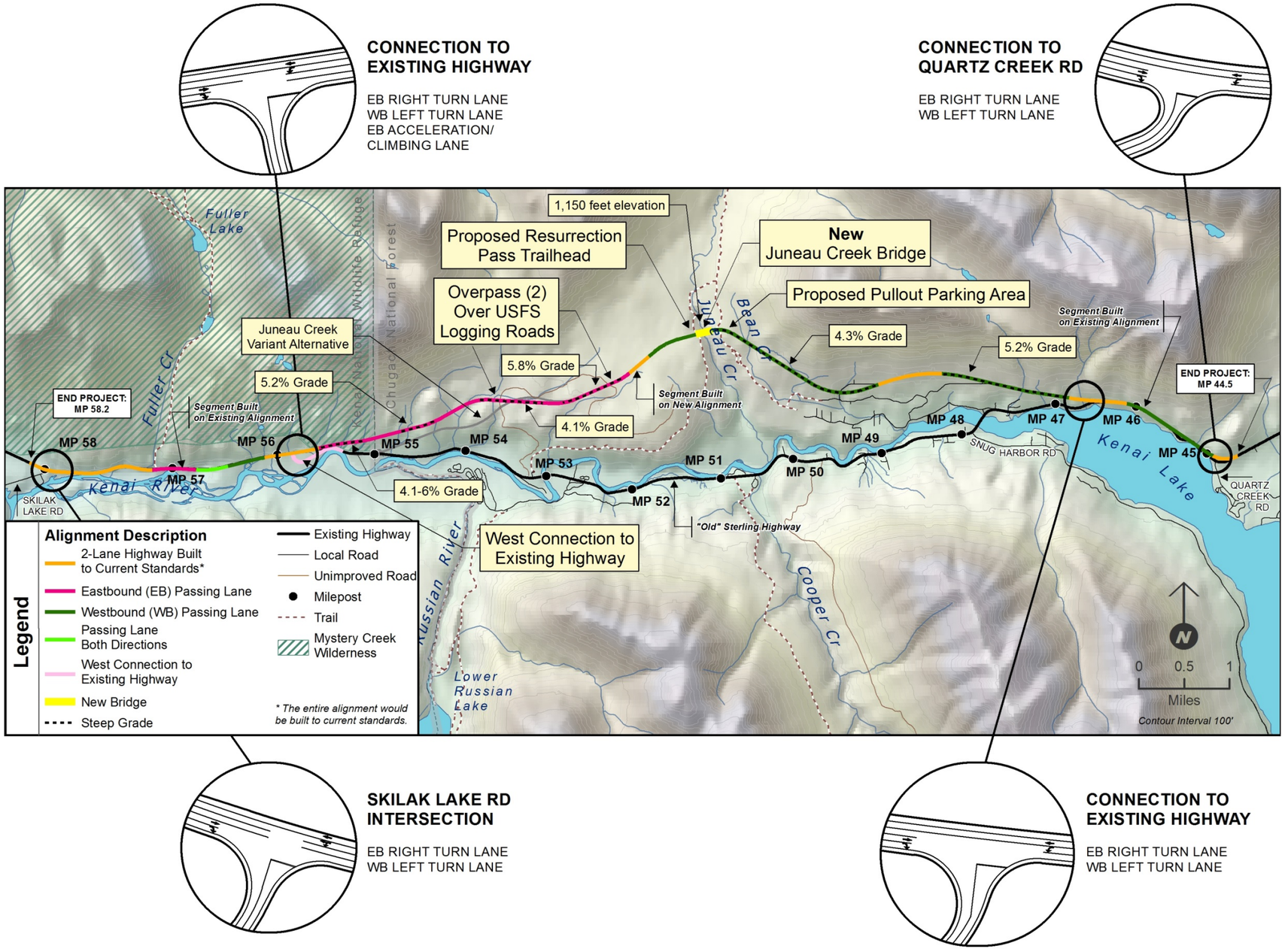

Map 2.6-4. Juneau Creek Alternative

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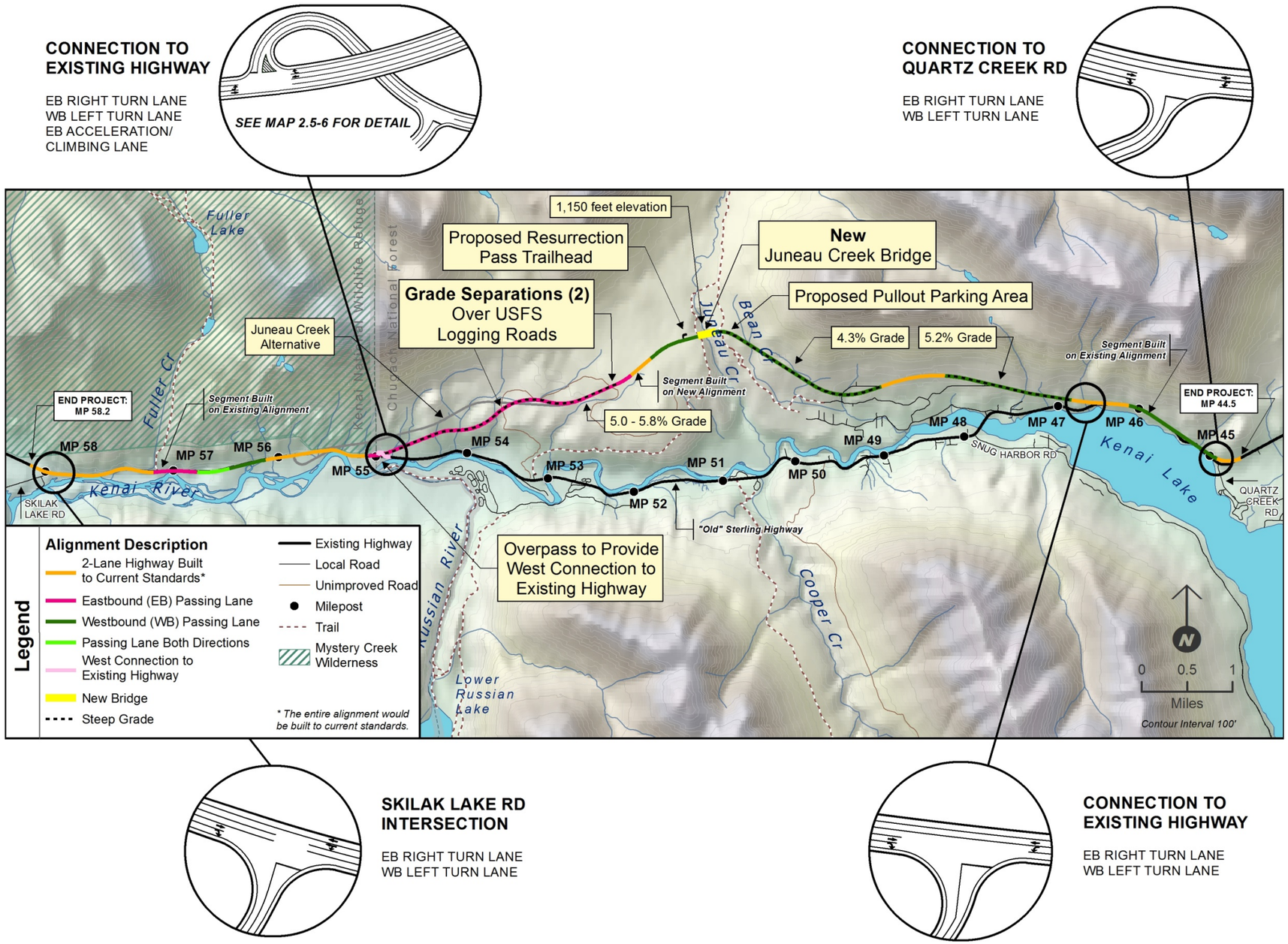

Map 2.6-5. Juneau Creek Variant Alternative

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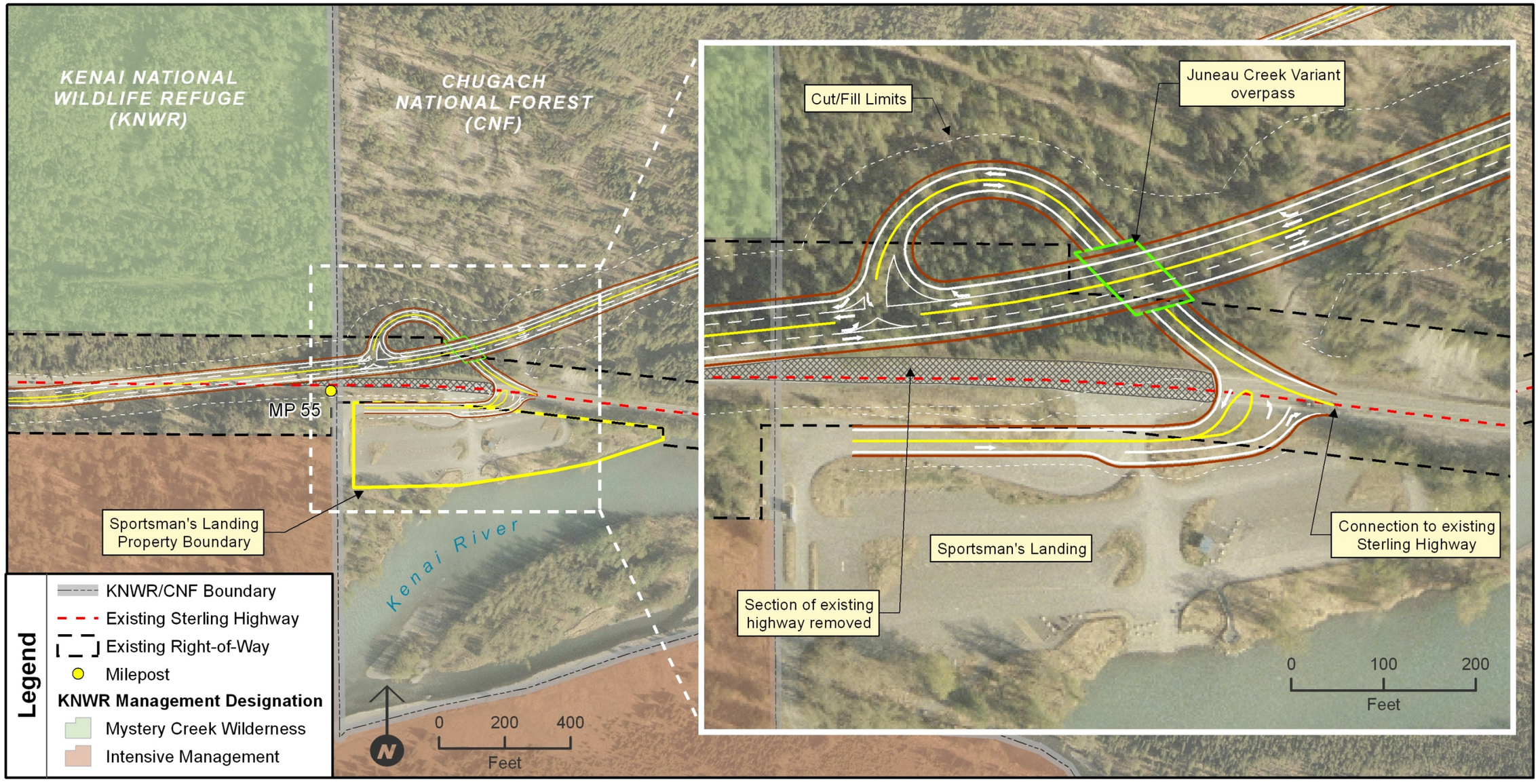

Map 2.6-6. Sportsman's Landing in Juneau Creek Variant Alternative

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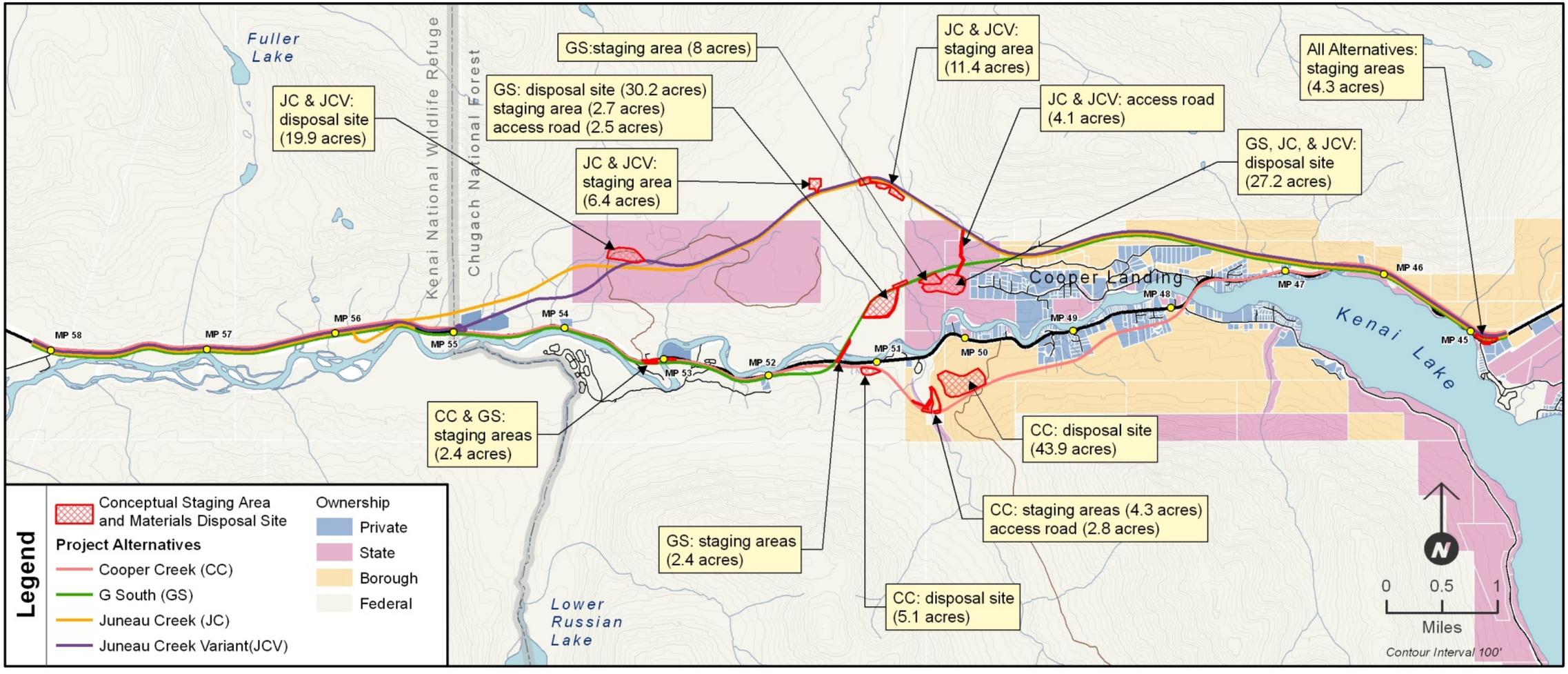

Map 2.6-7. Temporary construction areas

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